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ORIGINAL COMMUNICATIONS.

VITAL FORCE.

BY CHARLES MAYR, A. M., SPRINGFIELD, MASS.

It is astonishing how tenaciously some old terms will hang around our scientific schools, loaf about monthlies, and crowd themselves into scientific meetings. One of the very worst is vitality or, as the force which produces the "vitality" is often termed, "vital force." It is another remarkable fact that, though the word has disappeared from almost all the French or German schools, text and reference books, there is probably no school physiology in America and England which does not parade amply "vital" and "chemico-vital" processes, greatly to the delight of thoughtless teachers and pupils. Let us look exactly into this "vital force." Dr. Flint, an exceedingly cautious observer and recorder of observations, says: "If we confine ourselves to physiological facts we cannot admit the existence of a single vital principle which animates the entire organism. Each tissue appears to have its peculiar property dependent upon its exact physiological constitution, which we call vitality; a term which really explains nothing." So far Flint. Why should we now attack such a harmless little term which "explains nothing?" Just for this very

reason: As no one is able to connect any distinct idea with "vitality," one is too apt to suppose that some one who first used the term meant something by it, and that it explained to him satisfactorily what we cannot understand; we therefore suppose the matter to be all right and are lulled into a false security. It is true, it sounds very bad to be forced to say: we do not know it yet! but we do not gain by putting some varnish over a glaring spot of ignorance; far better to let it be seen by every one; perhaps there may come one who will wipe it out.

But unfortunately not only bashful ignorance hides itself behind this word; a kind of scientific hypocrisy uses the term where something else is meant. Why not use plainly the Anglo-Saxon word, "soul," when it is needed,—but it sounds so harsh! We should be very pleased to use either word if it meant the very least; but while "vitality" is supposed to be all-powerful, to build up the whole body, to carry on all its processes, one-fifteenth of a grain of atropia is sufficient to annihilate every trace of it. Would it not be good, by the same kind of logic, to call the force of the atropia atropal force, and the state produced by it atropiality? One fifteenth of a grain of atropia has more strength than all the vitality stored up in one hundred and fifty pounds of human organism! All attempts to explain the action of poisons on the supposition of the mysterious vital force as the all-powerful maintainer of life, have failed thus far. There is, besides, a certain cowardice in the use of such a vague word; it baffles and dodges all square fights; as soon as you put your finger on it, it is no longer there. Not fifty years ago every part of the body was "vitalized," from the urea, glycerine-phosphoric acid and lecithine to the albumen. Urea and lecithine have been produced identically in our laboratories. But these facts did not disturb the defenders of "vital force;" they simply pitched their tents "a little further West." Vital force retreated to albumen; when it was beaten out there, it retreated to the brain; and now it only clings still to the body by the protoplasma fibers. Let us hope a speedy flight of the vague word and the vague idea from this last retreat.

But what is live tissue? Though we cannot admit any special new force besides our well-known chemical and physical forces acting in the body, we have to acknowledge a radical difference between a certain organ, say a muscle in a living being, and the same organ in the same being, when it is dead. The life of every being is a succession of chemical and physical changes in its protoplasma network or in its bioplasson; as long time as this network is provided with proper

circulation, the first impulse of which was given to it by the mother-organism, just as long and no longer will the immensely complicated machine run; all the changes in the tissue of a living being are the same as they are immediately after its death; the tissues in contact with air, etc., decompose; but while after death there is no circulation to carry away the decomposition products as fast as they are formed, they are disposed of as long as the individual lives, by being transported to the proper organs to be absorbed, secreted or oxydized. After death, therefore, they will accumulate, will combine with the still undecomposed protoplasma, will cause first its coagulation and afterward its decomposition. This is the essential difference between live and dead tissues; from this stand-point it is very easily intelligible why any stoppage in the circulation is so speedily fatal to the parts affected. No disease of the lungs kills quicker than extensive embolism; hemorrhage of the brain is not necessarily fatal by the direct insult, but more by the disturbance and interruption of the circulation. Whatever cases of death we may consider, we will find that all of them are easily explained by the disturbance and interruption of the circulation. I mean by circulation not only the circulation of blood, but also of serum, lymph and other liquids of the body. Furthermore, the disturbance of circulation may have its seat in the nerve centers. All circulation is to some extent regulated by the "nerves," or rather by the bioplasson; special twigs of this substance run from the brain to every organ of the body. By affecting these twigs we can interfere with the circulation almost as much as if we would make a local disturbance; e. g., by cutting the fifth nerve at a certain point we may interfere with the proper circulation of all the fluids in the eye, and the eye may slough off. The effect of these nerves is rather to regulate than to produce the circulation. The propelling power of the whole circulation is at the foundation in the heart. But those who expect that here "vital force" will have to come in, would be deceived, since all kinds of stimuli have proved sufficient to cause the heart to contract, from warm water to electricity. Does, in cases where the heart has ceased to beat, perhaps for hours, and it commences again, "vitality" return? and where was it gone in the meanwhile? Can "vitality" be generated out of warm water? But if we consider circulation as essential for life, we may understand that in such cases the products of decomposition have not yet accumulated enough to coagulate the bioplasson and hereby render contraction impossible. Scientific investigators should never be ashamed to acknowledge

ignorance, where they do not know anything; but it is their right, nay, almost their duty to give a certain probable view of the case, only let them state it as plainly and clearly as language will allow. To those who enjoy big, meaningless words, we would recommend as reading matter the comedy of Moliére: Le Malade Immaginaire—the imaginary invalid. Two hundred years ago he ridiculed this tendency in a most skilled and clever manner. What Dickens was for the monstrosities of the English law, Moliére was for those of the physicians of his (our?) time.

INTERVIEWS.

Almost every city has a dentist who for a long period has been active in his profession. The great amount of experience amassed during a long period of practice ought to become common property of the profession. But men active with the mallet and plugger are not always at leisure to use pen and ink, and as the asking of questions is rather easy, we thought it a good idea to interview Dr. F. Searle of this city on certain points where experience alone can give reliable results. In a series of interviews, we propose to give our readers the grains of wisdom resulting from an exceptionally large experience extending over more than forty years. For this number, we interviewed Dr. Searle on *Local Anæsthetics*.

Q. Have you ever used morphia locally, and with what results?

A. I have used morphia locally in my earlier practice until I found that its effect was too slight to recommend its further use. If you give morphia internally to that class of patients who need it most, you will find that it renders them so sick and produces such general unpleasant symptoms that it seems hardly advisable to use it. If I now would use it at all, I would use it in combination with aconite, locally.

Q. Have you enclosed solid morphia in a cavity, and with what effect?

A. I have used it in this manner, but with no effect at all upon the constitution, and painful effects on the tooth; I could not explain the pain otherwise than by supposing the first effects of the morphia being to irritate the tissues.

Q. It acted, probably, like any other foreign body?

A. Harsh and incompatible. I used it also in connection with "Lethion," when "Lethion" first came into the market, when we first began to administer ether. I knew the parties; they sold the

receipt to give "Lethion"—from Lethe, the river of forgetting in the Greek Hades, hence "producer of forgetting," or sleep. They put morphia into the ether; the morphia was soon discontinued; it had no effect; it was only used to cover the real article and make it a compound. A few years ago Dr. Chase, of St. Louis, published an article saying that he had succeeded admirably in packing morphia into the cavities of teeth, and that this was the only remedy which never gave any pain. Immediately I put it into practice and followed it up until I found the reverse experience; I got no good whatever.

Q. Have you ever used any other organic local anæsthetic?

A. Chloral, or what is better called chloral-hydrate dissolved in camphor; they will dissolve readily and form a liquid. I have found it a local anæsthetic in operating on sensitive dentine. I speak with caution because persons often manifest pain when it is only the effect of fear. I mention it because I have obtained relief from its use. Perhaps if we could combine aconite with the mixture it might increase its effect; but I never tried it. Another local anæsthetic I used now and then is amyl, but I have a certain disinclination against it because of its odor.

Q. How far did you make use of arsenic as a local anæsthetic?

A. If I could use it just to the right point and know when to stop its use and how to arrest its action, it would be the most valuable remedy I would ever use. In my earlier practice, before I became afraid, I obtained some good results with the bad ones, but I found it so unmanageable, it operated so differently in different cases, that I have almost ceased to use it as an anæsthetic.

Q. In what time does the pain usually subside with judicious application of arsenic as a local anæsthetic?

A. No uniformity. In cases where there are pulp-stones or nodules in the pulp, I have found it to give intense pain for a long time; but even in the case of sensitive dentine it may give severe pain for hours, which may then cease. It should never be used in the first case. But we cannot always diagnose those pulp-stones; we may have our suspicions about them and remove the tooth and discover them, but otherwise they are difficult to diagnose. I do not remember that it generally gives much pain if used with creosote and applied to sensitive dentine, as I use it now and then.

Q. Have you ever observed cases of pure dental neuralgia without any gross anatomical lesions, for the causes of which we would have to look to the protoplasma fibers in the tooth?

A. It is a very common thing, and persons will come to me with what I term dental neuralgia. I once used the term at the dental convention at Saratoga, when I was on the committee for preparing subjects of discussion, and I suggested dental neuralgia as the subject. One of the committee asked what I meant by dental neuralgia; if I meant facial neuralgia. I said that I meant dental neuralgia. Now the term is quite common. What I mean by dental neuralgia is a pain about the teeth which the patients and the physician are very apt to overlook as not having its cause in the teeth. I consider as dental neuralgia only the one having its cause in abnormal conditions of the pulp or the other parts of the tooth. Dr. Garretson once had under treatment a case where the patient had lost all his upper teeth by extracting for neuralgia, without relief. Dr. Garretson examined the case and came to the conclusion that an injury some years ago had compressed the branch of the trigeminus at its passage through the foramen near the naso-massillary articulation; he based his reputation on the fact, performed the operation and cured the patient. This was therefore no dental neuralgia.

Q. What do you think about carbolic acid as an anæsthetic?

A. It is the most reliable we have; we could not get along without it. I have tried all, and think it the best.

Q. How do you suppose it acts?

A. By protection; coagulating the tissues beneath and protecting them from the oxygen of the air and other irritants.

Q. Have you met with cases where carbolic acid remained in a cavity for years without being entirely absorbed away?

A. Yes, I have known where the odor of carbolic acid was still present in the cotton years after it was put in; it shows great tenacity; it is probably because it encases itself into a shell of coagulated albumen.

Q. Have you ever observed any constitutional symptoms from the use of carbolic acid in dental practice, such as nausea, heavy breathing, slight fainting, etc.?

A. None, whatever. Yes, if you bring carbolic acid on soft tissue, like the lips or tongue, you may get painful sores which last for a week or longer, as I had a case a short time ago, where it came on the lip of a lady and acted like any other escharotic, producing a disagreeable sore. One thing I never saw in print is the use of carbolic acid in canker-sores. There it often gives instantaneous and permanent relief; carbolic acid will not increase the pain

as, e. g., nitrate of silver does, but it will form a protecting cuticle and generally the sores get well within twelve hours. I put a little on cotton so as just to moisten the cotton, and then by carefully touching and re-touching I can produce a protecting cuticle of any desired thickness. This was told me by Dr. J. H. Smith (New Haven).

Dr. Searle then showed his way of applying arsenic. He considers it a bad practice to take the solution on loose cotton, as some dentists do. He takes a small square piece of cotton cloth (size suitable for the cavity), holds one corner with the tweezers, and moistens it with carbolic acid. He then puts a paste on it, consisting of about equal weights of arsenic, acetate of morphia and carbolic acid, and applies this mass to the parts; as the mass weighed about three milligrams (.05 of a grain) and as one-fourth of it is arsenic, it is plain that not more than three-fourths of a milligram (.0125 of a grain) are applied to a tooth.

RESULTS OF ARSENICAL APPLICATION TO "SOFT" TEETH.

Editors of New England Journal of Dentistry:

I suppose that most of the older practitioners, at least, recognize the fact that there are a class of teeth often met with, which, in case arsenization and "root filling" is resorted to, do not *promise* as favorable results as a certain other class or classes. The first may be designated as white or soft teeth, as compared with the more dense or darker shades. Given a case of these white or soft teeth with the pulp exposed in such a manner or extent as to render it unadvisable in the judgment of the operator to "cap," and, consequently, arsenic or the forceps resorted to, experience seems to make the former a method of doubtful results; an abscess will probably follow sooner or later. Now I refer to this fact simply to raise the question of how and why this is so—a question which it has never been my fortune to see discussed. I will also venture a theory of my own, which I hope some of your readers will deem of sufficient importance to combat if it is not based upon reasonable grounds.

In order to express my *theory*, I will *suppose* a case in hand, before referred to: a white or soft tooth, especially "*soft*." Arsenic is applied—what then? A dead pulp, of course. Is that all? Let us go back a little. What do we mean by a "soft" tooth? In the light of the "Heitzmann theory," it must be one in which the protoplasmatic fibrils more largely predominate than in the "hard" teeth. The blocks

of lime-salts within this meshwork of protoplasm are smaller, and the protoplasmatic or live portions of the tooth are coarser and larger. They also extend through all parts of the tooth, dentine, cementum and enamel, connecting the peri-cementum, even, with the pulp. In the ratio of the coarseness or fineness of this protoplasmatic network, we denominate teeth hard or soft. Now, with all due deference to the difference of *opinion* as to the action of arsenic upon a tooth, I claim that a good deal more takes place under its application than the mere death of the pulp. The whole mass of these fibrils, throughout the entire tooth, from pulp to peri-cementum, die also sooner or later (by which I mean in a comparatively short time), as the result of the arsenical application. If, now, we proceed with our "supposed case," and even though we *do* succeed in removing, by some means or other, the *entire* pulp and fill the canal *completely*, what is the condition? The dentine, enamel and cementum still retain a large amount of dead tissue liable to all the results of confined dead tissue. Putrescence must follow. The more natural outlets into the pulp canal are closed, the resultant gases commence a bombardment of the innocent peri-cementum, and a life-and-death struggle with its vitality begins, usually proving fatal to our ungrounded hopes. Allowing this theory a basis in fact, the practical point applies in the matter of judging as to where the "*dead line*" is in cases as they are presented; just how "hard" a tooth must be in order to offer a reasonable guarantee of success in the operations under consideration. I am not considering at all the advisability of using or not using arsenic, but the method, *per se*. In the exercise of our judgment in such cases, constitutional conditions must be taken into account, as well as the tooth itself. They in fact go hand in hand, one the counterpart of the other. When the protoplasmatic fibrils of the tooth are fine, and the blocks of inorganic matter in their meshes are correspondingly large, there exists a proportionately less amount of dead matter to be disposed of and, as is usually the case, the so-called vitality of the peri-cementum is greater—the consequence being a greater vitality to cope with a weaker enemy, the difference being that of degree alone.

QUERIST.

TO CLEAN CELLULOID COLLARS, ETC.—Rub with a piece of sponge saturated with sulphuric ether, over the spots where water has failed to remove the soil.—*Items of Interest.*

SELECTIONS AND ABSTRACTS.

THE CELL-DOCTRINE AND THE BIOPLASSON-DOCTRINE.

. . . .

The founder of the Cell-Doctrine, Schwann, has recorded in the Introduction to his great work published in 1839 that the doctrine was based to a large extent upon investigation of the constitution of cartilage. After Johannes Müller had described cartilage-corpuscles that were hollow, and Gurlt had spoken of some as vesicles,—when Schwann had succeeded, as he thought, "in actually observing the proper wall of the cartilage corpuscles, first in the branchial cartilages of the frog's larvæ and subsequently also in the fish," he was led by these and other researches to conjecture "that the cellular formation might be a widely extended, perhaps a universal, principle for the formation of organic substances." And just as the study of cartilages has led to the cell-doctrine, which at the time of its establishment was a great advance in biological science, so the further study of cartilage has supplied the basis for a generalization which is a further development, and must take the place of the cell-doctrine. This is Heitzmann's doctrine of living matter, or, as I have named it, the *bioplasson-doctrine*.

When the term "cell" was introduced in 1838 and 1839, by Schleiden and Schwann, it was believed that on ultimate morphological analysis every plant and every animal would be found to consist of a number of minute vesicles or sacs, enclosing liquid contents in which is suspended a more solid body, the nucleus. For fully twenty years this idea has been known to be erroneous. In fact, *Goodsir*, nearly *forty* years ago---only a few years that is, after Schwann had established the cell-doctrine and attributed the vital power to the cell-membrane, I say, nearly forty years ago Goodsir had experimentally determined that the seat of the vital process of secretion is *not* in the vesicle as such, but in the so-called cell contents; Naegeli, in 1845, and Alexander Braun, in 1851, had also shown the cell-wall to be comparatively unimportant; and in 1857 Leydig had declared the "cell" to consist only of a soft substance enclosing a nucleus. Certainly, twenty years ago it was proved beyond dispute by Max Schultze, Beale, Hæckel, and others, that what was called a "cell" was not a vesicle, but essentially a jelly-like lump of living matter characterized by the presence of a nucleus; soon after, Robin, Brucke, Kuhne, Stricker, and others,

conclusively showed that not even a nucleus is an essential constituent of an elementary organism; and biologists were compelled to transfer the power of manifesting vital properties to "living matter" instead of restricting this power to any definite form-element. As long ago as in 1861, Brucke proposed to discontinue the use of the word "cell" as being a misnomer and misleading, and offered as a substitute the expression "elementary organism." Beale proposed, instead, the term "bioplast" to designate any definite mass of living matter, and Hæckel the term "plastid." From the latter I devised the word "plastidule" as synonymous with ultimate molecule of the substance of living matter. Elementary living matter is called with Dujardin "sarcode," or with Von Mohl "protoplasm," or with Beale "bioplasm," or, still better (because it is a designation etymologically more nearly meaning living, forming matter), "bioplasson." Of these four synonymous terms, "protoplasm" is the one best known; but has been used in other senses, as well as to designate, merely, elementary living matter. I therefore think that "bioplasson" is to be preferred. Of course, *dead* bioplasson is a contradiction in terms: bioplasson deprived of vitality is no longer bioplasson at all, but merely the chemical remains of what *once was* bioplasson. If this be remembered, there will be no confusion, even if the word be used in describing tissues, etc., after death. According to Drysdale, Dr. John Fletcher of Edinburgh was the first who clearly arrived at the conclusion that "it is only in virtue of a specially living matter, universally diffused and intimately interwoven with its texture, that any tissue or part possesses vitality."

As Fletcher's work was published in 1835, several years before even the establishment of the cell-doctrine, we cannot but agree so far with Drysdale as to say that Fletcher has framed a "hypothesis of the anatomical nature of the living matter which anticipates in a remarkable manner" its discovery! In 1850, Cohn recognized the protoplasm "as the contractile element, and as what gives to the zoöspore the faculty of altering its figure, without any corresponding change in volume." He concludes that protoplasm "must be regarded as the prime seat of almost all vital activity. but especially of all the motile phenomena in the interior of the cell." In 1853 Huxley said "vitality (the faculty, that is, of exhibiting definite cycles of change in form and composition), is a property inherent in certain kinds of matter." In 1856 Lord Osborne discovered carmine staining, and distinguished by means of coloring it the living formative matter from the

formed material, a means which has borne important fruits in the discovery of Cohnheim's staining of living matter by gold chloride, and in that of Recklinghausen's staining all except living matter by silver nitrate.

In 1858, and in a number of later articles, Max Schultze, by showing that, as had been hypothetically supposed by Unger, the movements of the pseudopodia and the granules are really produced by active contractile movements of the protoplasm, as well as by other observations, contributed much to the establishment of the theory of living matter. Hæckel has also for many years, and in various publications, labored to maintain and extend the same theory, of which he thus expresses himself: "The protoplasm or sarcode theory, that is the theory that this albuminous material is the original active substratum of all vital phenomena may, perhaps, be considered one of the greatest achievements of modern biology, and one of the richest in results." And says Drysdale: "If the grand theory of the one true living matter was, as we have seen, hypothetically advanced by Fletcher, yet the merit of the discovery of the actual anatomical representation of it belongs to *Beale*, in accordance with the usual and right award of the title of discoverer to him alone who demonstrates truths by proof and fact. . . . . The cardinal point in the theory of Dr. Beale is not the destruction of the completeness of the cell of Schwann as the elementary unit, for that was already accomplished by others. . . . But that, from the earliest visible speck of germ, up to the last moment of life, in every living thing, plant, animal, and protist, the attribute of life is restricted to one anatomical element alone, and this homogeneous and structureless; while all the rest of the infinite variety of structure and composition, solid and fluid, which make up living beings, is merely passive and lifeless formed material. This distinction into only two radically different kinds of matter, viz., the living or germinal matter and the formed or lifeless material, gives the *clue* whereby he clears up the confusion into which the cell-doctrine had fallen, and gives the point of departure for the theory of innate independent life of each part, which the cell-theory had aimed at, but failed to make good. The one true and only living matter—called by Beale germinal matter, or bioplasm—is described as "always transparent and colorless, and as far as can be ascertained by examination with the highest powers, perfectly structureless; and it exhibits those same characters at every period of its existence." . . .

"The name of bioplasm," continues Drysdale, "given by Beale, or protoplasm, as indicating the ideal living matter, cannot be given to any substance displaying rigidity in any degree, nor to anything exhibiting a trace of structure to the finest microscope; nor to any liquid; nor to any substance capable of true solution. Thus, 'nothing that lives is alive in every part,' but as long as any individual part or tissue is properly called living it is only so in virtue of particles of the above-described protoplasm freely distributed among, or interwoven with the textures so closely that there is scarcely any part –^{1}– of an inch in size but contains its portion of protoplasm. Thus we see realized the hypothesis of Fletcher, that all *living action* is performed *solely* by virtue of portions of irritable or living matter *interwoven* with the *otherwise dead* textures." The objection, however, urged by *Bastian* to Beale is so very pertinent, that it must also find a place here, but I shall not dwell upon other points on which Beale differs from the bioplasson doctrine; such as. that living matter exhibits the same characters at every period of its existence; and that it is always perfectly structureless. "It has always appeared to me," says Bastian, "to be a very fundamental objection to Beale's theory, that so many of the most characteristically vital phenomena of the higher animals should take place through the agency of tissues—muscle and nerve, for instance—by far the greater part of the bulk of which would, in accordance with Dr. Beale's view, have to be considered as *dead* and inert."

In 1873, the morphological knowledge of living matter became exact. In that year, Heitzmann discovered the manner in which bioplasson is arranged throughout the body, and announced the fact that what had until then been regarded as *separate form-elements* in a tissue are really *interconnected portions* of living matter; that not only are there contained *no* isolated unit-masses in any *one* tissue, but *no tissue* in the *whole body* is isolated from the *other* tissues; and that the only unconnected particles of living matter are the corpuscular elements of liquids, such as blood, sperm, saliva, pus, etc., and so-called wandering corpuscles; so that, to use his own words, "the animal body as a whole is a connected mass of protoplasma in which, in some part, are imbedded isolated protoplasma-corpuscles and various not-living substances (glue-giving and mucin-containing substances in the widest sense, also fat, pigment-granules, etc.") This announcement marked the commencement of a new era in biology.

Heitzmann discovered that the living matter as seen in an amœba

is *not without structure*, as had, before his acute investigations, been supposed; and that its structure, in all cases when developed, is that of a network, in the meshes of which the bioplasson fluid, or the not-contractile, not-living portion of the organism, exists. When there is a nucleus, it is connected by delicate threads with the extranuclear network; nucleoli and nucleolini inside of the nucleus, as well as granules outside, are portions of living matter; sometimes in lump, sometimes mere points of intersection of the threads constituting the intranuclear and extranuclear living networks, sometimes terminals of section of such threads, as first explained by Eimer, and after him by Klein.

Heitzmann discovered that what is true of the structure of bioplasson in the amœba, where a single small unit-mass of living matter constitutes the entire individual, is true also of the structure of bioplasson of all, even the highest, living organisms.

To be sure much had been previously known regarding protoplasm or living matter, but the knowledge was fragmentary, until Heitzmann demonstrated *not only* that membrane, nucleus, nucleolus, granules and threads *are really* the living contractile matter, but also, 1st, that this matter is arranged in a network, containing in its meshes the non-contractile matter, which is transformed into the various kinds of basis-substance, characterizing the different tissues of the body; and, 2d, that the tissue-masses of bioplasson throughout the whole body are *interconnected* by means of fine threads of the *same* living matter.

Unless these two facts of Heitzmann's discovery are accepted, there cannot be urged much against the continued use of the word "cell," misnomer though it be. Ranke, after speaking of the "cell-wall," "cell-nucleus," etc., says: "Of these component parts of the cell, one or other may be wanting without the totality ceasing to be a cell. The nucleoli, the cell-wall, or the nucleus may be wanting, and yet we must designate the microscopic form a cell, or elementary organism." Drysdale thus comments upon this quotation, viz.: "If any one choose to describe a gun-barrel as a stockless gun without a lock, he is free to do so; but what good purpose can it serve? Or is there even any fun in it? The truth is, this clinging to the mere name of the cell-theory by the Germans seems to arise from a kind of perverted idea of patriotism and of *pietas* toward Schwann and Schleiden." But, I think Tyson has the better of the argument in saying: "The word 'cell' has become so intimately associated with

histology, that it is doubtful whether it will ever fall into disuse, nor does it much matter, so long as correct notions of the elementary part are obtained." Now, if *there were any* separate and distinct "elementary part," it certainly would matter little or nothing whether it were called "cell" or by any other name, provided the name be properly defined and agreed upon. It is not against the name but against the idea of any *isolated individualized form-element*, that the objection lies. Virchow maintains "that the cell is really the ultimate morphological unit in which there is any manifestation of life, and that we must not transfer the seat of real action to any point beyond the cell." Against this statement nearly every author nowadays protests, and insists that vital power must be transferred from the "cell" to "living matter;" yet, after all, the disagreement, though ever so strenuously declared, is a mere verbal one, so long as both parties hold that "every higher animal presents itself as a sum of vital unities," no matter what these unities are called or how defined. Hæckel, one of the most avowed advocates of "the protoplasm or sarcode theory," clings to Virchow's politico-physiological comparison, that every higher organism is like an organized social community or state, in which the individual citizens are represented by the "cells" (no matter how he may define these), each having a certain morphological and physiological autonomy, although on the other hand interdependent and subject to the laws of the whole. Heitzmann's views necessitate the comparison of the body to a machine, such as a watch or a steam-engine, in which, though there are single parts, no part is at all autonomous, but all combine to make up one individual. Even Huxley, the popular champion of protoplasm as the physical basis of life, quite recently delivered an address, before the International Medical Congress in London, August 9, 1881, in which he used the following language: "In fact, the body is a machine of the nature of an army, not of that of a watch, or of a hydraulic apparatus. Of this army, each cell is a soldier," etc., etc. According to Hæckel and Huxley, the body is composed of *colonies* of amœbæ; according to Heitzmann the body *is one complex amœba*. I am very anxious to really make the difference between the cell theory and the bioplasson theory clear to every one of you. The essential point of the cell theory is, the idea that the body and each tissue of the body, every plant, and every animal, is made up of a number of distinct units, and the essential point of the bioplasson theory is, the idea that all the masses of living matter of each tissue

of plants and animals are uninterruptedly connected, and that every tissue is connected with every other tissue by filaments of living matter. To accept Mr. Huxley's comparison, we must imagine that every soldier is indissolubly connected, hand and foot, with every neighboring soldier of the solid army!

There is no *better test* of the TRUTH of the bioplasson doctrine than the structure of hyaline cartilage. If hyaline cartilage consisted, as "is generally believed," of "a homogeneous ground substance, in which are closed cavities harboring the corpuscles," the bioplasson doctrine would certainly be erroneous. If it merely contained lymph, or juice-channels, no matter what their character, whether open or closed, whether lined or unlined, whether in "homogeneous basis-substance," or "between layers of cells," or "in cement-substance," then, too, the bioplasson doctrine would be erroneous.

But the result of my observations admits of but one interpretation, and that an interpretation favorable to the bioplasson doctrine. It is unnecessary to more than mention that although I have placed on record so few, I have made many different examinations, under many different circumstances, and with varying powers of amplification.

To be able to uphold the cell-doctrine, cartilage would have to be, using a homely comparison, like a cake composed of hard dough with raisins. No matter how widely we may extend the definition, to remain within the boundary of the cell-doctrine this metaphor must be applicable. Innumerable painstaking researches have led to various modifications of notions entertained regarding the structure of the two constituents of the cake and their relation to each other. It may be seen by the most recent publications on the subject, that the acceptation of the existence in the dough of cleavage in certain directions, of interlaminary and interfibrillar spaces and of offshoots, even ramifying prolongations of the raisin-substance, or, at all events, of an ingredient of the raisins, is held to be not incompatible with the cell-doctrine. If, however, we can represent cartilage as a filigree or framework of raisin-substance, in the meshes or interspaces of which framework blocks of dough are imbedded, certainly the fundamental view of the ultimate construction of the tissue is changed, and we are no longer in accord with the cell-doctrine, even though we be inclined to use that term in the widest possible sense.

The result of my investigations as to the structure of cartilage is that in this tissue, beyond the possibility of a doubt, the living matter is arranged in the form of a net-work containing in its meshes the

non-contractile matter. How is it with regard to the other proposition of the bioplasson doctrine, viz., that the living matter of the different tissues is interconnected? Examinations with high powers enable me to answer this question to the effect that fine filaments of living matter pass from one tissue to another in connection with the network of living matter in each. The details of these examinations are reserved for another time! But it has been suggested to me that I ought not to conclude without saying a few words as to the *practical* advantages of the Bioplasson-Doctrine over the Cell-Doctrine. Well, *every exact* scientific investigation, even though at first of *theoretical value* only, sooner or later brings with it some practical benefit; and this doctrine of living matter, aside from the satisfaction which the perception of ABSTRACT *truth* grants—lying as it does at the foundation of our knowledge of living things—has advanced their physiology, and pathology at every point! In *Practical Medicine* it has already aided us in so many ways that their merest enumeration would require another hour's lecture. We know that the disposition of living matter is different in different persons, and that in the case of increased supply of food the *reaction* is different in strong and healthy people from that in the sick and weak. Upon this knowledge rests, to-day, the *whole doctrine of pulmonary consumption.* Now, the *amount of living matter* within the same bulk *varies greatly*, both in normal and morbid conditions. A small lump of bioplasson in the urine or expectoration, taken from an individual of *good* constitution, will show a *close* network with coarse granulations, or perhaps be almost *homogeneous*-looking under the microscope—owing to the *large amount* of living matter in the small bulk; while a plastid from a weak, broken down or phthisical person will be finely granular and exhibit a *network with large meshes* on account of the *relatively small amount of living matter* in it. Sometimes we thus from the examination of a *drop of blood* gain an insight into the condition and vital power of the whole individual; sometimes, recognize a disease before it is sufficiently developed to do much harm, and thus come a step nearer to the *highest aim* of the physician—the *prevention* of disease.—Prof. LOUIS ELSBERG, M. D., *Science*, Dec. 10th, 1881.

CIVILIZATION IN ITS RELATION TO THE INCREASING DEGENERACY OF HUMAN TEETH.

The *Independent Practitioner* copies from the *Jour. Brit. Dental Asso.* a paper read by Dr. Norman Kingsley, of New York, before the International Medical Congress, on the above subject. He said :

The most important undetermined problem now confronting the dental profession was embodied in the inquiry made daily by anxious parents in substantially the following form : "Why do my teeth decay more rapidly than my father's or mother's did, and why are my children's teeth decaying at an earlier age than mine?" The inquiry did not come from those who neglected their teeth, or from the lower classes of society, the ignorant or the depraved. It was confined to no particular race or nationality, but came from that class which was the most intelligent, the most highly cultured, and the most finely organized in any community, irrespective of race, locality, or climate. It was useless to treat the inquiry lightly, or to attempt a denial of the premises. The cases were exceedingly rare, if they existed at all, where the teeth of the children were sounder than those of the parents, and we must admit the conclusion that with each succeeding generation the dental organs were becoming more and more degenerate. What response had the practitioner to this inquiry?

After citing the usual varied replies, with comments thereupon, the Dr. continues as follows :

Other vague theories, used often without much understanding, were formulated, but the most comprehensive, and the most tangible withal, which had been made sponsor for this growing curse of the human race, was *civilization*. What was civilization, and what had civilization to do with decaying teeth? It meant, an emerging out of barbarism into refinement, out of ignorance into knowledge, out of bondage into liberty, out of privation into comfort. Civilization expands the intellect, represses vice and savage instincts, cultivates virtue and noble aspirations, encourages the growth of the emotional nature, and enlarges the domain of human sympathy. Civilization defies and controls the elements, organizes commerce, builds cities, railways, telegraphs and factories. Civilization is the divinely appointed method through which mankind derive their greatest blessings, and by which they reach their highest possible state of intellectual, moral, and social development. Only through civilization would the millennial or ideal existence of the human race ever be attained ; civilization, therefore, was a normal condition of mankind. In the more refined and luxurious

conditions of life we found physical labor exchanged for mental, and strain of mind took the place of strain of body. Muscular tension ceases, and nervous tension takes its place. The mind is constantly on the alert, and the brain has no rest. The nutrition of muscles and bones is diverted to repair the undue waste of nervous tissue, and, sooner or later come, inevitably, the long list of nervous diseases which now so threateningly confront us. The causes which tend to produce such results were more active and more potent in the Northern United States than in any locality in the globe. The reasons for this had their foundation primarily in the institutions of the country, and the stimulus which the country afforded for the intensest mental activity. But testimony was not wanting that the same thing in kind was now going on in Great Britain, and even heretofore stolid Germany was undergoing a like transition. Nervous diseases and decay of teeth were correlated, both being symptoms of a common cause. The teeth required constant nutrition, as did the muscles, the bones, or any other organs or tissues of the system. Teeth decay primarily because the nutrition of their organic structures being withdrawn, retrogade metamorphosis ensues. Caries is simply solution or disorganization of both constituents by agents which are always external, but which would be quite inert under other constitutional conditions. When nutrition is insufficient or diverted, the resisting power of the vitality inadequate, and destructive agents present, the teeth will yield at their weakest point, and caries is the result. The ordinary remedy for these evils, and the salvation of the race from degeneracy and destruction would seem to involve a return to a condition of life more consistent with hygienic laws. The pessimistic view of the future was without reason, for while degeneracy of the teeth was certainly on the increase in certain families and classes, there were equally certain signs of its abatement. With increasing wealth, families had less cares, less anxiety, less nervous strain, more ease, more attention to hygiene, and better habits of life. The intellectual activity of to-day, and the energy and intensity of modern thought were not inconsistent with a sound constitution, with perfect health in all the tissues, and with long life. It was the worry which wears out the nervous system, and not the work. Civilization, the glory of mankind in their maturity is, nevertheless, in no wise responsible for the accidental effects which have resulted from a violation of her true principles, for out of civilization ought to, and must, come the grandest example of humanity the world has yet seen, without spot, or blemish, or taint of disease.

EXTRACTS FROM THE ADDRESS OF DR. A. M. DUDLEY, BEFORE THE MASS. DENTAL SOCIETY.

The future reputation of this Society will depend greatly upon the character of its past and present members. It therefore becomes us to place as high as possible the standard of excellence, and we should carefully guard against the admission to our ranks of those who occupy a doubtful or low position in our profession. Our success, as an organization, depends more upon the zeal and earnestness with which we work as co-laborers for the advancement of our calling than upon our numerical strength. I think the time has fully come when we should change our Constitution, so that applicants for admission to our Society shall have first graduated from some respectable medical or dental college, or have received a license from some board of examiners appointed under State law, before they shall be considered eligible to membership in this organization. Other dental associations having a large proportion of their members from among dentists resident in our State, and holding their meetings frequently in our cities and towns, have seen the wisdom of placing this limitation upon their requirements for membership, and have witnessed the good results attending its adoption. Why should we, who are regarded as the representative dental organization in our State, longer make it possible for those who are the veriest charlatans in our midst to be entitled, as far as the qualifications we require are concerned, to come among us, and be of us, simply because they have had a sign, denominating them dentists, hung upon some building for the term of five years, and for that length of time have practiced, not in our profession, but upon a too confiding and correspondingly suffering public? It may be true that we have none such now among us, or that it is not often that they seek for admission to this body. But in our present position, we place ourselves upon an equal standing with them. We say to the public that the man who has been in the practice of dentistry for five years, although he may never have gazed upon the pages of a work upon dental science, or may not possess the slightest qualification for such practice in a scientific manner, is just as much entitled to knock at the door of this organization and seek admission to it, as any one, however much he may have studied, or however well qualified he may be, by thorough and special preparation, to enter upon the practice of our calling. Again, our position upon this question is such that we ignore altogether the dental schools and colleges. If a man, without any previous training whatever, can begin, as is not infrequently done,

the practice of dentistry, and after having so practiced for the term of five years, can be entitled to, and gain, admission to this body, simply because of that five years' practice, however bad it may have been, he can say to himself "of what use is it for me to spend my time in attending a dental school? I can be recognized by the representative body of dentists in the State, and the public will then of course recognize me, and I am just as good as any of them." How ridiculous would seem the Massachusetts Medical Society, and how little confidence would the great majority of the public have in it, as a body of intelligent and scientific men, if it allowed any person who had simply called himself a physician for five years, the privilege of claiming, for that reason, the right to membership in that body. The question will not bear consideration for a single moment, and yet our position is just as ridiculously absurd as theirs would be if it were such as I have stated. I do not wish to be understood as denying the fact that we have in our profession many men who have never graduated from any medical or dental school, and yet who, by reason of long experience and private study, are well qualified for pursuing their chosen avocation. But I believe the time has fully come when the only legitimate and recognized entrance to our ranks should be through the educational institutions of our specialty, or those of general medicine. These schools are so numerous, and the facilities for acquiring a proper dental education are so many, that there is no longer any excuse for a person's entering upon the practice of the dental art without first having graduated from some respectable and recognized dental or medical school. I will not argue this question further, although much remains to be said in favor of the adoption of the measure I have urged. I leave the subject in the hope that our Constitution may be speedily changed so that we may occupy a higher and more consistent position.

I do not hesitate to declare, after most mature reflection upon the matter, in all its bearings and influences, that it is urgently important that our profession in this State should be also protected, as are the legal and educational professions, by legislative guards and restrictions. Everybody knows that no applicant to the first named of these two is admitted till after he has successfully responded to the severest ordeals of examination by qualified experts. The law accords this justice in order that the members may protect their professions from obtrusive pretenders who have never achieved the intricate knowledge that their theory and practice demand; and the professions accord to the public the protection and defence which such restrictions provide,

that the public may not be duped by charlatans, nor misled and harmed by ignorance. By our educational laws, protection is afforded by the restriction that no person shall be employed as a teacher in any school in the State, until such person shall have been actually examined, and, if found qualified, duly approved by the committee of the city or town wherein such person has applied for appointment. And the law further declares that the Treasurer of such city or town shall refuse payment of the bill of a teacher for service rendered, until he presents a certificate setting forth that examination has been held and approval given. And should any unapproved teacher chastise a pupil for alleged ill-conduct, an action for assault may be maintained. Now with such protection for the law and the school, and with such protection as the clerical profession has provided for itself, all these protections having, as their ultimate object, the protection of the public, it would seem that argument was hardly necessary to show its necessity in the profession of the dentist. May we not hope that it will be secured by effort from within our own organization. I know it will be urged that it will be useless to appeal to the legislature, in view of the recent non-success of the physicians and pharmacists in their endeavors to secure such enactments as they have desired., But an examination of the subject will show that the causes which led to their defeat will not apply to us; and I believe that earnest effort upon the part of this society, through the labors of a committee appointed for the purpose, with such coöperation as may be secured from other societies in the State, will give us a law that will prove of great value to the dental profession and to the public. I most earnestly urge the adoption of such a policy as wise and necessary.

Dr. Luton, of Rheims, reports that he has discovered that the tincture of ergot of rye, associated with phosphate of soda, produces on those to whom it is administered an hilarious excitement similar to that which is brought on by laughing-gas.—*Popular Science Monthly.*

In re-pointing instruments care must be taken not to overheat them; it injures the steel. They will be found much improved, if, before bringing them into the desired shapes, they are pounded considerably. This reduces any assumed crystallization heat may have produced, to the more fibrous condition of the best steel.—*Items of Interest.*

EDITORIAL.

It is not simply boldness or the wish of notoriety which induced us to accept the duties of a "Scientific Editor" of the *Journal*, but the impulse of strong—very strong—convictions and opinions, supported by extensive studies of chemistry and medicine in German universities. Chemistry is growing more and more powerful; medicine, which formerly considered chemistry only as one of its servants, is falling slave to the new queen of sciences; physiology has long time ceased to consider its topics as being different from those of a highly developed chemistry; chemistry is appearing on the field of all branches of science, and also dentistry will sooner or later fall its victim. Perhaps the fact that we never finished entirely our course of medicine, but turned into chemistry as a speciality, gave us more taste for physiology, etiology and diagnosis than for therapeutics, while it supplied us with a large amount of useful and thorough instruction in the medical branches by the most famous teachers of Germany. Chemistry is the most positive of all sciences, and the character has a tendency to go from the science to the student. We therefore love facts and positive knowledge. But as the best facts, without reason, never will be of much use, we shall exert our best reason to build on sound facts sound conclusions. As far as our influence will go with the *Journal*, we vouch unflinching fight to all vagaries of language and theorizing. We fully accept the grand discoveries of Dr. Carl Heitzmann of New York and his followers, as the basis of our physiological views.

We, of course, are not responsible for the communications of our fellow-editors, and do not intend to interfere with their views. We believe in the independence of all contributors.

Probably the reader himself will notice the new features of the *Journal*. All the good in common journalism will be used by us. We invite all who wish progress and enlightening to send us contributions, and all those who do not agree with us, may they give *the best expression* to their objections. Truth never suffers, and, regardless of creed, school or title, we beg them to bear in mind, if our attacks and criticisms seem harsh or personal, that we want nothing but "*the truth, the whole truth, and nothing but the truth.*"

CH. MAYR, A. M., B. S.

RAMBLINGS AMONG THE MONTHLIES.

The *Cosmos* of December opens with an article on "Liberty, without Law, is License," by Dr. W. P. Church. The title is rather strange and, put in such a general way, certainly wrong; every term of the saying not admitting of an exact definition, there follows that the whole saying is full of snares for the unsophisticated mind. From the vigor with which Dr. Church defends "government at any price," there is reason to suppose, that he is within the party governing in Rhode Island, not within the one governed. Government looks all right seen from within, but not quite so, from without. Many sentences are stated with a surprising dogmaticism, sounding rather more Russian than American. "Man, from his nature, must serve." "There must be a dominant power," etc. The whole paper shows clever sophisms, sentence for sentence. We, of course, approve a certain amount of government's control over all affairs of life, but only as far as the individual cannot protect himself without this aid; but this law-making craze to swell the statute-book with dead and cumbrous sections, which only now and then serve in the hand of the stronger to annoy the weaker, ought to be resisted by all means. As dentistry is an art and science, by which *irreparable* injury can be inflicted, it ought to be regulated to some extent; but will all law-making ever prevent that even the best practitioner now and then blunders, not to speak of the "minor gods"?

The proceedings of the American Dental Association are reported very elaborately. In discussing "caries," there appears to be a general neglect of the fact that lime-salts do not necessarily want an acid for their solution. By no means! There are many neutral and even alkaline fluids that will dissolve lime-salts. It is well known that sugar will dissolve carbonate and hydrated phosphate of lime, the first to a very considerable extent; if chemists analyze for the so-called alkaline earths, they can prevent entirely precipitating the carbonate of lime by adding ammonium-chloride. This mixture of ammonium-carbonate and ammonium-chloride is strongly alkaline, yet it will keep in solution large quantities of carbonate of lime. Many other substances act in the same way. Therefore, gentlemen, in theorizing, do not forget that the lime-salts of the tooth do not necessarily need acids for their solution!

The arsenic question came up in the meeting of the Odontological Society of Pennsylvania. We reserve it to ourselves to enter thoroughly upon this question in one of our next numbers.

The closing number of the "*Miscellany*" contains one of Dr. W. H. Atkinson's valuable papers. His strong attacks on the old rut may seem at first reckless, yet the more one enters into a careful study of Dr. Heitzmann's beautiful discoveries, the more one feels nebulosity in the old view, truth and clearness in the new one. The term "proto-vertebræ" seems to be a misnomer, being in the first place a mongrel between Greek and Latin, and then it might mislead, since "vertebræ" at present has an exact and universally adopted meaning, while these "proto-vertebræ" have nothing whatever to do with the real vertebræ. In fact, when we first heard the term, it suggested the idea, that they were small disks making up the embryonal vertebral column, which is impossible, as the ontogeny of this organ shows that it originates as a furrow in all its length by one process of doubling up. This term is so misleading, that we would rather suggest the term "proto-disks," or any other name which might not produce a wrong first impression.

Dr. I. B. Davenport publishes his paper on Chemical Abrasion. His conclusions seem to be in the main in accordance with and based upon chemical and physical facts.

In an editorial the *Miscellany*, in parting, gives heaps of good hints as to the "Coming Dentist; What We Want; Enlightening the People, and Duties of a Dentist."

The first article in the *Ohio State Journal* is a very interesting lecture on the muscles of the lower jaw. In any case of accident with breaking of the jaw and consequent dislocation, the article merits to be consulted, since it treats as plainly and elaborately the special effects of muscular traction, as it might be expected and wanted.

In an article, "Development of the Enamel," Dr. M. S. Dean utterly ignores the discoveries of Dr. Heitzmann and Bœdeker about the structure of the enamel. He considers it as "general belief" that the "gelatinous mass which forms the greater portion of the enamel-organ, filling up the interstices between the stellate cells, has no more important function to perform than to fill up the space which is to be subsequently occupied by the growing tooth." Apart from the unscientific "general belief," we should like to know on what grounds this exceedingly inadequate supposition is given as "general belief." The theory of "this proteïne substance being a storehouse of phosphate of lime," seems utterly untenable on closer investigation; we will not be able to account for the lime-salts in the enamel unless we accept the fact of vessels and circulation in the enamel; the lime-salts of the

enamel are the secretions of the bioplasson of the enamel, just as the coral rock is the secretion of the coral animalcules.

Dr. F. W. Sage continues an article on "Alveolar Abscess," full of excellent points in practical directions.

In a report on Pathology to the Kentucky State Dental Association on "Pulpless Teeth," by Prof. A. O. Rawls, the author makes the strange statement: "The general impression is that, since the dentine and cementum are not analogous in their structure, and that one being furnished with nutriment from without and the other from within, that accordingly there is no continuity of nutrient circulation from one to the other, but that they are separate and distinct tissues." This "general impression" needs general correction. Every one of these statements has been proved to be, to say the least, highly hypothetical. Has Prof. Rawls never looked at Dr. Bœdeker's drawing of a tooth in the Cosmos? We would only request him to do it and to read the accompanying paper, and then he may himself criticise his own statement. That the "cementum is nourished from without" is strange, and needs careful confirmation; but perhaps a look at the cuts will reverse the course of the nutrition. Many of the conclusions based upon this "general impression" become faulty, as the basis is wrong. We should like to enter into the paper more, sentence for sentence, and to show how easily one may draw quite plausible conclusions from wrong premises. The best saying of the article is: "A practice based upon an erroneous conception of its underlying principles cannot be progressive, and can be conservative only by accident." (Sic!)

We can hardly understand why an anonymous in the *Ohio Dental Journal* makes cheap fun of a good and necessary undertaking—the dental nomenclature and terminology—as attempted by one of the standing committees of the American Dental Association. The only words to criticise such an article, are, that it is infantile and microcephalic. People who think such negro-minstrel-effects of criticism adapted to a scientific paper, should rather have been born before the invention of the printing press. Far better, quite appropriate, and just as full of useful hints as a serious article, is the little comical story by F. M., in the same paper. It is very well told, and we could not help laughing heartily over it.

Among the subjects of interest to dentists in the *Independent Practitioner*, is a reprint of an article on the nature and mode of origin of the lead line in the gums, by Hilton Fagge, which shows a careful and critical observer.

Another article of general interest is an abstract of an address of Dr. John Simon's, before the section on public medicine at the International Medical Congress, on "The Value of Experiment in Preventive Medicine." He will have the endorsing of every lover of truth in his attack upon the law against vivisection, as passed recently in England. Only ignorance, joined with mediæval superstition and modern æsthetic vagarism, could bring about the passage of such a law, which, as Dr. Simon plainly shows in some cases, forces English physicians to make their experiments outside of England!

Dr. W. C. Barrett opens the *Dental Jairus* with an article which will swell the heart of every dentist, if he reads how dentistry has progressed during the last twenty years, and, from a mere mechanical craft, like a blacksmith's work, has become a science.

As we bow ourselves, with our editorial hat in hand, into the sanctum sanctorum of the Independent Practitioner, may we be allowed to offer our most cordial and appreciative congratulations in view of what may be confidentially expected of it in the future, judging by its past, but, more especially the "NEW VOLUME," to wit, the January No. From your *electric light* we shall expect to draw much assistance in maintaining our *sperm candle* up here in New England.

Our abstract from Prof. Elsberg's lecture on "The Cell-Doctrine and the Bioplasson-Doctrine" is a long one; but if every dentist who does not already understand the theory, or *fact*, we should say, will read and re-read it until he has thoroughly *assimilated* its truth, it will be *invaluable* to him in his practice, to say nothing of the personal satisfaction of a true conception of primal facts.

We are glad to note the fact that Mr. Wm. M. Williams, of our local dental depot, has added to his large stock of dental supplies a department of medical and surgical instruments. We suppose this to be one of the results of the recognition of dentistry on the part of the American Medical Association. How is it, "Billy?"

Exchanges of medical, dental and scientific journals are respectfully solicited.

The "Annual Address" delivered before the Mass. Dental Society, last June, by Albion M. Dudley, D. D. S., is worthy of careful reading and consideration by every member of the Society. It has no weak point, or uncertain sound. Could every member of the Massachusetts Legislature listen to, at least, that portion of it which speaks of the desirability of regulating the practice of dentistry by "*legislative guards and restrictions*," they might possibly see that the interests of every citizen *imperatively demand* such legislation, and govern themselves accordingly. This part of the address wisely precedes that on professional education. Nothing could be a greater inducement to one entering the profession to devote time and money to a thorough preparatory course of instruction than to feel that the laws of the State recognize dentistry among the educated professions, and protects its members from professional association with the unqualified and undeserving. The address as a whole should be read by every young dentist especially. It would tend to raise him to a higher standard, and insure for him a larger field of usefulness and, correspondingly, greater pleasure in his life-work. We regret that we must content ourselves with only an *extract* in this number.

We think we are but voicing a universal sentiment when we say we are sorry that the "*Miscellany*" has ceased to exist. This is especially true here in New England where the democratic qualities of this journal were appreciated by a very large class. It was to a greater extent an organ for many of our New England Societies and members of the profession, generally, than any other, and one that the average class of dentists, at least, could feel was approachable. On this account it was none the less ably conducted, or less valuable. Its editors and proprietors will carry with them a large measure of kindly good feeling, and cordial wishes for success and happiness in their new field, on the part of the profession, because of past courtesies, reciprocal favors and agreeable relations. In closing the series of these volumes we honestly confess to a feeling that much is lost to the pleasure and satisfaction of our professional life.

Brother Watt, we are heartily glad to welcome your *Monthly*. Such good things cannot come too often. We, as individuals, have had and enjoyed you from your "Genesis," but our publishers would like to Ex.

PROSPECTUS.

First.—We believe that there is a promising field of usefulness in New England for a wide-awake, wisely-conducted Dental Journal, heretofore occupied only in part, and prospectively, by recent events in dental literature, almost entirely "shut out in the cold."

Second.—We believe, also, that the facilities, and a sufficient amount of concentrated energy and determination are at our disposal to warrant us in undertaking the responsibility of meeting this demand.

Third.—We recognize the fact that, to a greater extent than ever before, the dental profession "is imbued with the spirit of *original investigation;*" that never before has there been so earnest a demand for *absolute facts and scientific exactness*, in place of careless statement, fanciful theorizing and undue reverence for venerable authorities. In view of which, we have secured the services of an eminent and broadly educated scientist, not only to preside over this department of the Journal, but to work with us in a systematic review and sifting of the accepted basal principles of dental science and a diligent and organized search for such new truths as the rapidly advancing and broadening fields of the sciences in general may have in store for our specialty. Results from this source will be promptly communicated through this Journal.

Fourth.—The "Associated Dentists," who comprise the general editorship, are all actively engaged in the practice of dentistry, and are entirely independent of all alliances and ambitions other than the best interests of the profession in its highest sense.

Fifth.—It is hoped that the dental profession will make free use of these columns as a ready means of intercommunication. Consider it, gentlemen, as your own, and take an active interest in it. We especially call the attention of Secretaries of Societies to this point, and hope they will act upon it.

Sixth.—While we are domiciled in New England, and assume our name as a convenient one to distinguish this from other Journals, we nevertheless aspire to the plain of making our influence felt for good, in common with so many other New England institutions, throughout the entire land.

Seventh.—We must confess to a hurried preparation of this number, which necessarily involves many shortcomings, calling for the kindly exercise of charity; but, with more time, and the completion

of present imperfect arrangements, we expect to enlarge our space, and sharply compete for supremacy in dental journalism.

Eighth.—We earnestly solicit the aid of the profession in subscriptions, and original contributions, incidents of practice, etc., promising, on our part, to exert ourselves to the best of our joint ability to realize your ideal of a dental journal.

Ninth.—Terms of subscription are $2.00 per year, in advance. Single copies, 25 cents.

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NEW ENGLAND JOURNAL CO.,
Springfield, Mass.

SOCIETIES.

PROCEEDINGS OF THE CONNECTICUT VALLEY DENTAL SOCIETY.

The Annual Meeting for 1881 was held at Springfield, Oct. 27 and 28, at which a number of new members were enrolled.

Prof. Shepard presented models of a case of replantation, and the tooth that had been replanted.

Prof. Mayr presented a paper, entitled "A Synopsis of the Rare Elements and their Possible Use for Dental Purposes." This paper caused much interesting discussion.

The evening session of the first day was devoted to the adoption of a new Constitution and By-Laws, and election of officers.

It is hoped that this new Constitution will materially benefit the Society, by dividing the work more generally among the membership.

The following officers were then elected:

President—Dr. C. Fones, Bridgeport, Conn.
1st Vice-President—Dr. N. Morgan, Springfield, Mass.
2d Vice-President—Dr. O. F. Harris, Worcester, Mass.
Secretary—Dr. A. M. Ross, Chicopee, Mass.
Assistant Secretary—Dr. S. E. Davenport, New York.
Treasurer—Dr. W. H. Jones, Northampton, Mass.

Dr. F. Searle, who at a previous meeting had handed in his resignation as a member of the Society, for purely personal reasons, withdrew the same, much to the gratification of those present.

A pleasing feature of the morning session, the second day, was the exhibitions made by different members to the Society, under the head of Special Methods.

Dr. Strang exhibited an appliance for regulating teeth, to be used either outside or inside the arch at pleasure. Also, an appliance for elongating teeth.

Dr. C. F. Bliven and Dr. C. T. Stockwell exhibited useful appliances for the operating table.

Dr. Shepard exhibited English forceps, teeth, and appliances of different kinds.

Dr. E. S. Niles gave a resume of his experiments and investigations of phosphate fillings. He said there were four or five kinds of phosphoric acid, and therefore many different kinds of phosphate fillings. The liquid part of these fillings is a dibasic acid, $2\ H_2O\ P_2\ O_5$, and has its objections, as the soda which is added is soluble in pure water. Care should be taken to keep these phosphate filling materials from the air, as they absorb moisture. The doctor advanced the idea of putting up the acid and powder in separate tubes of glass, a sufficient quantity in each—the two, when combined, to make a large filling. These tubes are closed at each end by placing the ends in a flame of the Bunsen burner. The heat making the glass molten, and also expanding the air in the tube, makes the receptacle, when sealed, a vacuum. The powder which should be used is the mixture of oxides of silica and zinc. Fillings prepared from such a mixture wear very much better than those in which the oxide of zinc alone is used. The fact that the liquid congeals in some cases, as in Fletcher's cement, for instance, may be due to the presence of nitrate of silver or to aluminum, though my tests in that direction are not complete.

Dr. C. W. Strang presented a paper entitled "Contour Filling *vs.* Free Separation Method for Preserving the Teeth." This paper was listened to attentively, and also discussed.

This very interesting topic for discussion was next in order before the Society: "Do Serious Results follow the Extraction of Teeth for Girls between the ages of Eleven and Fifteen Years?"

Prof. L. D. Shepard, in reply to the request to give a report of the International Medical Congress, gave, without any preparation for it,

a very pleasing and entertaining description of the Congress, from memory, and described the manner of giving invitations to members to dinners, receptions, etc.

The President appointed the following Executive Committee:

Dr. C. T. Stockwell, Springfield, Mass.

Dr. J. J. Vincent, Amherst, Mass.

Dr. C. W. Strang, Bridgeport, Conn.

It was voted that unless the Executive Committee decide upon a union meeting with the Merrimac Valley Dental Society, the semi-annual meeting for 1882 should be held at Amherst, Mass.

Adjourned.

MASSACHUSETTS DENTAL SOCIETY.

The seventeenth Annual Meeting of the Massachusetts Dental Society was held in Boston, December 8 and 9, 1881—the President, Dr. G. F. Waters, in the Chair.

The committee to petition the Legislature for a law regulating the practice of dentistry in the State reported progress, and was continued.

The following officers were elected for 1882:

President—D. B. Ingalls, Clinton.

1st Vice-President—A. B. Jewell, Newton.

2d Vice-President—D. M. Clapp, Boston.

Secretary—W. E. Page, Boston.

Treasurer—Edward Page, Charlestown.

Librarian—R. R. Andrews, Cambridge.

Executive Committee—Drs. E. B. Hitchcock, D. F. Whitten, Leon Rideout, F. M. Robinson, F. E. Banfield.

W. E. PAGE, D. M. D., *Secretary*.

PHYSIOLOGY AND HISTOLOGY.

Dr. William H. Atkinson, of New York, said at the Semi-Annual Meeting of the Conn. Valley Dental Society, June, 1881, much upon the fundamental truths underlying Physiology and Histology. Among the many good things, he said:

"All up to 1874 concerning researches in histology was vague and unsatisfactory. The *primal* truths were not discovered until Carl Heitzmann demonstrated the organism of protoplasm. We have none of this in our text-books, and therefore they are no guides but

in a false direction. Too many think that studying histology means simply the memorizing the statements in books. I do not object to histologists recording their interpretations of what they see, but I do object to their requiring the reader to receive, without fair specimens of what they see, their records. The only *study* of this subject is by actual observation with the microscope.

Remak discovered the mesoblast which produces the nerves; until then only epiblast and hypoblast were known. In an early stage of development, the embryonal corpuscles divide into bone plates, nerve plates and muscle plates. These proto-vertebræ are not distinguishable by their shape yet, but their location shows us the difference.

Take the chick between the fourth and tenth day of incubation, and slice it along the line of the primitive spinal column, and you will see accumulations, that is, oases of round bodies in the lay out, not very clearly definite. These are the proliferations of embryonal corpuscles.

I want every seeker after the truth of histology to know that principles must be first apprehended; that the organization of protoplasm must come first within our conception. This is the corner stone first to be laid."

AMERICAN ACADEMY OF DENTAL SCIENCE.

President, ...	Dr. T. H. Chandler, . . .	Boston.
Vice-President, . . .	Dr. Geo. T. Moffatt, . . .	Boston.
Recording Secretary, .	Dr. H. F. Hamilton, . . .	Boston.
Corresponding Secretary,	Dr. E. B. Hitchcock, . . .	Boston.
Treasurer, ...	Dr. L. D. Shepard, ...	Boston.
Librarian, ...	Dr. H. C. Merriam, ...	Salem.

Censors, Drs. C. P. Wilson, J. H. Batchelder and J. T. Codman.

In a previous report of the last meeting, which occurred October 26, 1881, unfortunately the gentlemen's names who officiated as essayists were omitted. They were as follows:

Dr. Benjamin Lord, New York.

Dr. S. F. Stearns, Boston.

Dr. Geo. L. Parmelee, Hartford.

Dr. H. C. Merriam, Salem.

Dr. Merriam made remarks upon sand-paper disks in place of a written essay.

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ORIGINAL COMMUNICATIONS.

CONTOUR FILLINGS vs. THE FREE SEPARATION METHOD FOR THE PERMANENT PRESERVATION OF THE TEETH.*

BY DR. C. W. STRANG, BRIDGEPORT, CONN.

In the consideration of this subject, so much has already been said and written that I can hardly hope to add anything new, except, perhaps, to express conclusions reached after a number of years of experience and close observation.

In looking through the pages of our dental publications, one cannot fail to notice the diversity of opinion expressed by different contributors. The free separationist is firm and positive in regard to his method, while the champion of the contour is no less decided; and it would be strange, indeed, if a fair proportion of the members of the profession should not pass along in their calling amid the clouds and mists of indecision. If any of this latter class are present, I trust I shall be able to contribute something that may influence you in favor of the adoption of a system, the practice of which inspires a love for the work, a determination that each succeeding operation shall be more nearly perfect than the former, and which accomplishes

*Read before the Conn. Valley Dental Society.

more fully the desired end, namely, the permanent preservation of the teeth. Any method which, in its workings and results, does not measure up to this standard should, in my opinion, be regarded with misgivings. It is charitable to suppose that all are seeking after the truth, with an earnest desire to do that which is best for the individual cases presented for treatment.

About ten years since, Prof. Robert Arthur's work came into the hands of the profession, and, while we admire and honor the man whose spirit of thoroughness and conscientious devotion has impressed itself upon, and is reflected by, his work, yet, in the light of the present, we fear the results of its teachings have brought sorrow, discontent and discouragement to the hearts of many confiding men. Professor Arthur claims, First. "That all the teeth of every individual, with rare exceptions, may be preserved. Second. That decay may be prevented from occurring at places where it is most destructive, and requires the most difficult, painful and expensive operations for its arrest. Third. That all the attention necessary for the certain preservation of the teeth (provided it be given in time) is of simple character, and quite within the ability of any dentist of ordinary acquirements. Fourth. That the pain usually attending dental operations may be entirely avoided. Fifth. That, as the operations required are of simple character, the cost of the preservation of the teeth will be diminished."

All this, with the advent of the dental engine, armed with corundum disks, dental reamers, etc., to render a simple operation still more easy of accomplishment, so terribly depleted the ranks of the contourists that it is doubtful whether a score of them could be found in all the land. The Professor concedes that, after the operation of separating the teeth has been skillfully performed, the most scrupulous care, both upon the part of dentist and patient, will not prevent a recurrence of decay in *some* instances. Probably most of us have learned that all the care we can bestow, united with the best efforts of the patient, is unavailing, and decay will recur in a *majority* of the cases so treated. This may not follow where there is not a crowded denture; but I have not yet discovered one in which the good accomplished has not been more than overbalanced by evils present. A large proportion of those applying for our services are young people; decay is present upon the approximal surfaces of molars and bicuspids. If we resort to the free separation and flat filling method, how soon are some of the spaces closed, while others are widened, thereby disfiguring the mouth, and,

after a few months, a condition of things exists which we must acknowledge to ourselves will soon render former operations defective and useless; for we cannot doubt that the forces which have disintegrated and destroyed well-formed enamel, will soon tell at the margins of the most perfectly adapted gold fillings in the same localities. We see that in the near future more tooth substance must be removed, for it must be considered an imperative duty to keep the spaces free when the teeth have once been separated. This state of affairs is very favorable to the acceptance of "new departure" theories, and practices, as well, for gold fillings inserted "by hook and by crook" in this class of cavities are not reliable. It is no small annoyance to hear so frequent complaints in regard to the wedging of food in these spaces and the discomfort occasioned thereby. It is neither an easy or agreeable task to examine a mouth which has been subjected to this treatment for a few years. One must needs enter the field well provided with floss silk, wedges, and Jarvis' Separators, to decide at one sitting whether defects exist; and, when found, I am persuaded there are few who covet the privilege of repairing them or reinserting fillings.

Several cases have come under my notice in which the roots of the superior cuspid and bicuspids have gradually approached until, to all appearance, the septums of alveolar process have been absorbed, while the external and internal plates remain quite firm and unchanged. "United, they stand," or stay. If a full denture is to be retained permanently and *comfortably*, I believe this end can be obtained by contour filling only. It will not be necessary for me, in this paper, to enter into a description of the operation, as all its details were fully given by Dr. Webb to this society at its last annual meeting, and appear in the September number of the Dental Miscellany. Permit me here to personally express my thanks to Dr. Webb for very valuable suggestions and information given in his excellent paper.

By this method decay is not only prevented, but the teeth are retained in their sockets in the precise position where nature designed they should be; while the advantages afforded for subsequent examinations are apparent, no difficulty being experienced in passing a delicate exploring instrument along all portions of the marginal walls. The gums are protected and remain healthy, as there can be no packing or wedging of foreign substances between the teeth. Is the propriety of opening from the masticating surface and making complicated operations questioned, where *seemingly* only small cavities exist?

I think that almost invariably, in these cases, when the rubber dam has been adjusted and all the moisture has been evaporated by the application of alcohol and the use of the air syringe, a greater portion of the enamel will be found disintegrated than was at first suspected; all this must be removed and the parts protected. This can be most effectually accomplished by contour filling.

A word in regard to filling materials to be employed in making these operations. While I think cohesive gold indispensable in most of them, yet, where time to the operator and expense to the patient must be economized, tin foil may be used in cavities not exposed to view. It is true that fillings of this kind, exposed to much attrition, will wear away, and at some future time may need to be partially renewed; but even with this disadvantage, the tooth operated upon can be so contoured and kept from actual contact with the adjoining tooth, that a recurrence of decay will not follow. In the preparation of approximal cavities for the reception of tin fillings, depend upon no retaining points or fissures in the masticating surfaces for the retention or strength of the filling; while the body of the cavity is so prepared as to retain the filling, prepare each fissure so that it may retain the portion placed therein. If approximal cavities are to be operated upon, and contouring with gold or tin is out of the question, as age, physical and other conditions are to be considered, prepare them as simple cavities, leaving the general form of the tooth unimpaired, and fill with Hill's Stopping. This soon changes upon the surface, and actual contact of enamel with enamel is prevented, decay is retarded for a season, at least, and the mouth is left in a favorable condition for subsequent operations of a more permanent character. Regarding, as I do, the method of free separation ruinous and demoralizing in all its aspects, respect for my seniors in the profession would deter me from proffering advice to them; but to those who have just entered the profession, or are about to do so, I would say, never resort to it as a means of saving the teeth. While the contour principle involves close application, hard work, and is perhaps less remunerative on the whole for the time occupied, yet, to the conscientious operator the satisfaction arising from having done the best for those who have placed themselves in our care, is a nobler recompense than *mere* dollars and cents.

ALBUMINOIDS.

BY CHARLES MAYR, A. M., SPRINGFIELD, MASS.

In its number of January, 1882, the N. E. Journal brought a highly interesting abstract from Dr. Elsberg on the Cell-doctrine, which is worth being read by every dentist until he understands it and should it be necessary to read it a dozen times. Only by being capable of understanding with ease such articles, the dentist rises above a tooth-driller and tooth-plumber. But modern science is no longer a child's play that one may take in between roast-beef and pie. It requires careful and assiduous work to be mastered. As a kind of chemical complement, and to facilitate the understanding of discussions about scientific histology, we give a small lecture on albuminoids.—Chemists designate with albuminoids or proteine-substances all the different kinds of living matter, that is, of that matter which, if supplied with proper circulation, will exhibit phenomena of contraction, of movements, assimilations, etc. Many varieties may be distinguished. We only will give the chief ones and their reactions. The source of the supply of the albumen properly is the white of the egg, and the names of albumen, albuminoids, etc., are indeed derived from this substance. The white of an egg is an organized substance. Can it be called live tissue? Where is its "vitality?" We might hesitate to call it so. If left to itself it will never start up any other process but that of chemical decay; the warmth alone by affecting the composition of its bioplasson will start up the first movements; and just as a small stone may start an avalanche, thus the slightest impulse is sufficient in tissue provided with proper bioplasson to produce the phenomena of "life." Yet I do not consider it yet as proved, that there does not exist some kind of life in an egg; the porous shell certainly admits of an exchange of air, and, if I am not mistaken, some years ago, a physiologist proved that eggs have a kind of respiration, that is, an exchange of oxygen and carbonic acid through the shell; if this should be conclusively proved, an egg—I chiefly have in view birds' eggs—would resemble a marmot in its winter sleep; some slight action is still always going on, until the warmth by allowing the chemical changes to take place more rapidly produces more rapid circulation and more "life." The albumen of the egg considered chemically is a combination of an organic substance with salts. Most chemists consider the salts like impurities, yet to me the salts seem of the highest importance since they are certainly the cause of the varieties of different kinds of

albumen—nay, of the differences of eggs of different animals. The composition of egg-albumen is—abstracting the salts:

Carbon, 53.4
Hydrogen, 7.0
Nitrogen, 15.6
Oxygen, 22.4
Sulphur, 1.6

The salts, amounting to about five per cent., are chiefly carbonates, phosphates, chlorides of lime, soda, potassa, etc. They are not simply accidental, or impurities, but they are essential. If one dries carefully egg-albumen at about 40 degrees C. (104 F.), one obtains a pellucid mass containing all the salts. By pulverizing finely this mass and treating rapidly with water one may dissolve out the salts,—the water here acts like an acid—but the remaining albumen is no longer soluble in water; it has become a different substance. Another remarkable fact is that, though fresh egg-albumen is of alkaline reaction, it contains lime salts in solution, showing that alkalicity does not necessarily preclude the solubility of lime salts,—of consequence in the theories about decay of teeth! If one heats a solution of egg-albumen,—can it be called properly a solution, Dr. Heitzmann?—the albumen becomes insoluble in water; it coagulates,—this coagulated albumen is again a different substance from the original one. Most mineral-salts precipitate albumen from its solution without combining with it in larger quantities than what some chemists term "impurities;" every time we obtain a different kind of albumen; in fact, the simple egg-albumen, the easiest to obtain and experiment upon, is so full of dark and difficultly explorable reactions, that the chemist who will clear up this mist will have done much. Moreover, every slight heating produces modifications in the combination of albumen and water. The chemical constitution of albumen must be highly complex. We understand with the term chemical constitution the arrangement of the groups of atoms existing in the compound, e. g., the constitution of common ether is: Two molecules of the radical ethyl, that is of the fundamental compound of alcohol, combined with one molecule of oxygen; or, more decomposed still, expressed by the formula

$$CH_2—CH_3—O—CH_3—CH_2.$$

CH_3 is marsh-gas; $CH_2—CH_3$ is ethyl, etc. According to the analyses the formula of albumen cannot be less than $C_{89}H_{140}N_{22}O_{28}S$, while ether is only $C_4H_{10}O$, and has already quite a constitution. If we further reflect, that water is essential, that the salts have to be

introduced into the formula, every chemist will understand that we do not need any other force than those of the chemical radicals to explain richly all phenomena; only at present our chemical knowledge does not yet quite grasp the multitude of atoms and radicals in this compound. But let us again descend to gross facts and words. Similar to the white of the egg is the albumen in the yolk, but already different, consisting of

Carbon, 52.8
Hydrogen, 7.3
Nitrogen, 16.4
Oxygen, 22.3
Sulphur, 1.2

It is slightly acid in its reactions.

Blood contains some albumen of about the same composition and reaction as egg-albumen. In the crystalline lens and within the blood-corpuscles, another albuminous substance is contained, termed *globuline* or *crystalline*. Its composition is

Carbon, 54.3
Hydrogen, 7.0
Nitrogen, 16.5
Oxygen, 21.00
Sulphur, 1.20

Hence more carbon than the first.

Haemocrystalline is the albuminoid combined with the haemoglobine of the red blood-corpuscles; the haemocrystalline is not colored, but capable of crystallizing; its composition is almost identical with the foregoing variety.

Quite different is the red-coloring substance of the blood-corpuscles; it is called *haemoglobine* or *haematine*, and contains 6.6 per cent. of iron. If blood stagnates in abscesses or exudations, or in aneurisms, one often finds red crystals. These are entirely different from the foregoing: they contain almost no iron, but in its place oxygen; they are insoluble in water and diluted acids,—the substance has received the name *haematoidine*.

Fibrine is the coagulating substance in blood, from which it may be obtained quite pure by beating and kneading the coagula in a stream of water. Fibrine is almost unknown in its soluble modification; as soon as removed from the organism it will coagulate with or without access of air. Is it perhaps nothing but bioplasson, which dies if not in contact with proper circulation? If the water contains salts,

fibrine may be dissolved in it; the solution shows the reactions of common albumen. Not all fibrine is soluble in water containing salts; the fibrine of arterial or diseased blood often does not dissolve, while that from venous blood always is soluble. In contact with oxygen it takes it up and gives off carbonic acid. The ashes in fibrine form only about 0.5 per cent. Its composition is

Carbon, 52.6
Hydrogen, 7.0
Oxygen, 21.8
Nitrogen, 17.4
Sulphur, 1.2

The substance of the muscles consists of *musculine* or *syntonine*, a substance resembling fibrine very much. Its composition is

Carbon, 54.9
Hydrogen, 7.3
Nitrogen, 16.2
Oxygen, 20.6
Sulphur, 1.1

Caseine is the albuminoid in milk; it is distinguished from all the other albuminoids by the property that it does not coagulate at boiling heat. Many substances produce coagulating: acids, salts, the secretion of the stomach of calves. Coagulated caseine is our cheese, generally coagulated by the secretion of a calf's stomach, which always adheres to the mucous membrane which is thrown into the milk in the process of cheese-making; caseine is even slightly soluble in alcohol if an alkali be present. Its composition is

Carbon, 53.6
Hydrogen, 7.1
Oxygen, 22.6
Nitrogen, 15.7
Sulphur, 1.0

Similar to albumen, fibrine, caseine in animals, we have albumen, fibrine, caseine in plants termed gluten (in wheat)—corresponding to fibrine, or legumine (in beans, peas)—corresponding to caseine. Many of the ferments like diastase, pepsine, pancreatine or tryptine, etc., have again different but similar compositions. Quite different in their composition are connective tissue and cartilage, e. g., cartilage is composed

Carbon, 50.0
Hydrogen, 6.6
Nitrogen, 14.4
Oxygen, 29.0

To sum up, we may say that bioplasson (or protoplasma) is a chemical, highly complex compound of an albuminoid with a certain amount of water and salts. That it assumes the shape of a net-work in all tissues—teeth not excepted—is a consequence of similar laws to those which give to a crystal its shape, though at present we do not yet understand much of it clearly.

The protoplasma-fibers of the teeth, or as they are often termed the bioplasson, resemble syntonine. How can a dentist expect to talk very sensibly about teeth without having any trace of a conception as to the nature and chemical reactions of this kind of fibrine? All the crude theories of a tooth being a block of lime with a few organic impurities to be filled like a mineralogical specimen, with a gold plug in every crack and hole, simply to render it more valuable to the proprietor, must appear to every student as a sad lack of knowledge and common sense on the part of the advocate of such inadequate views. Probably most of the dentists have heard, and we hope may hear still for many years, Dr. W. H. Atkinson speaking about embryonal condition, etc.; they will not understand one particle of it unless they compare carefully the reactions of syntonine, or the normal fibers of a tooth with those of albumen or the dissolved fibres; the first are the crystals, while the second is their concentrated solution. All we wish to attain by this article is to show to the profession the need of chemical studies, chiefly of the albuminoids.

THE MICROSCOPE.

BY A. M. ROSS, CHICOPEE, MASS.

Prof. J. J. M. Angear, President of the Microscopical Section of the Iowa State Medical Society, said, at a recent meeting, that "the scientific medical man could get along as well without the stethoscope or the speculum as without the microscope." Does it occur to the dentist seeking attainment of truth in the principles of his profession, that he might as well try to gain these as well and as soon without his engine and its equipment as without this instrument? Perhaps a novice in the use of the microscope, such as myself, cannot emphasize his belief that the microscope is as essential to progress with the dentist as are his many improved appliances for perfecting his manipulative ability. I think, however, that the time is rapidly coming when this fact will be more generally recognized than now; that the dentist must

better and more fully understand the tissues that in such varying conditions come daily under his hand for treatment. It is not the object of this paper to speak of any revelations by this instrument, that being a subject that can be better presented by those better qualified. But I wish to present to the readers of this Journal the fact that it is not necessary to invest a small fortune to secure a good compound microscope and boutique of tools and accessories—some of which every dentist has on his operating case.

For a description of the *good*, low-priced stands I here give, I am indebted to Dr. Carpenter's last edition of "The Microscope and its Revelations," attested to by the experience of personal friends who have made the subject a study, and as a result of my own observation. There are in this country and Europe makers of microscopes who furnish an excellent working instrument for less than fifty dollars, plus the duty, if imported. One of the best of these is made by the Messrs. Ross, of London, known as the *Ross* (*Zentmayer*) *Student's Microscope*. This instrument, in case, costs ten guineas ($48.33).

There is an instrument recently placed on the market by George Wales, of New York, called the "*New Working Microscope*," that has features of excellence, and, as a stand, for the money, is first-class. Price, with two eye-pieces and two objectives, thirty-five dollars. These two being of the best of this class of instruments, it is unnecessary to mention the many others that may be equally good. Attention is called to these microscopes, *not* as an advertisement of them, but because they are excellent, and that many dentists and others are deterred from investigating the subject with a view to buying, because of the belief that from $100 to $500 is necessary as an investment to secure a practical microscope. The *value* of these instruments is in ratio with the perfection of their optical parts, particularly of the object-glasses; and these stands mentioned, with the best corrected glasses, will give as certain results as when the same glasses are used upon the highest-priced stands. Of course, it is understood that, for the price, first-class oculars and objectives cannot be furnished; but the oculars are usually very good, and, better objectives selected in place of those usually furnished, will bring the usefulness and reliability of the instrument to a first-class standard.

The objectives are what constitute the real value of the microscope. They should be selected with the greatest care, the distinctive features of value to the histologist being clearness of outline or definition of the object, and penetrating power.

In glancing over a catalogue of accessories to the microscope, an inexperienced person is overwhelmed by the many additions that it *seems* necessary to make in order to be in *good working condition*, and this is not to be wondered at inasmuch as journals upon microscopy, as well as compilers of catalogues, devote so much space to the consideration of the different kinds of dark ground or parabolic illuminators, polariscopes, etc. These produce very pretty effects and in certain lines of research, for instance, such as measuring the angles of crystals, may be valuable accessories; but they are of no value to the histologist. What is essential to him, is an ability to produce a faithful image of the object under examination, more or less amplified, as the character of investigation may require, with glasses that will define the object sharply and that will permit a deeper view of the object than simply the surface thereof. Now, the objectives that give these results are known by the term "medium angle;" that is, they do not permit as much light to enter the objective as those objectives termed "high angle," and in order to obtain the necessary light when using "medium angle" objectives of high magnifying power, a system of lenses has to be used between the object and the light, as a condenser, and it is a valuable accessory. Such a sub-stage condenser may be easily and cheaply adapted. An eye-piece or a low-power objective will answer excellently this purpose. For those who use a monocular stand an eye-shade is indispensable, and its surface should be dark. I made mine out of black rubber. It is made from a piece of vulcanized rubber about one and a half inches wide by four long with a circular aperture just the size of the tube cut in one end. When it is in position the eye not in use comes before this shade and should not be closed. There is by its use no strain to the eye muscles. There are none who use the microscope who are better qualified to fit up their own accessories than are the dentists. They have the ingenuity and facilities for making almost everything needed in the line of helps that other people have to buy.

For less than one hundred dollars a good microscope may be had with such glasses and accessories as shall place the possessor in position to commence and prosecute the study of histology. For a *new chair* a dentist will invest from $150 to $200. Let me urge all those who are thinking of some such change as this in operating chairs, to work a while longer over the old one, and buy a microscope.

DENTAL FURNISHING.

The statement of a boy, while in our office not long since, that it was pretty well filled with "bric-a-brac," may not be very far from true as regards many of our modern dental offices, at least if we somewhat misapply the term. That a dental office should be reasonably well furnished, and free from all that would indicate lack of care or cleanliness on the part of the dentist, would seem apparent to all, after so much has been said on the subject. That enough has not been said would seem equally apparent, from the fact that so many offices are not only unsuitably furnished, but so neglected and filthy as to be disgusting to the most negligent of patients. It is without doubt better to have an office quite simply, neat and tasteful, than the most lavishly furnished, with an appearance of slovenliness. However, whether it be of the plainest or most lavish style, the modern dental office absolutely demands, in its *operative departments,* furnishing with a liberal hand and an even greater manifestation of neatness. We look back to the advent of cohesive gold and the resulting extended operations in filling teeth, as bringing the necessity for, and the inventive skill to produce, the many inventions and appliances we now find so absolutely essential to success. If we were restricted in our operations to the facilities at hand of even a few years ago, we believe there would be a large turning back to the old styles of operations and the necessary loss of many teeth which are now saved to continue a comfort to patient and testimony to the achievements of modern dentistry.

Though our fine operators are but few compared with the demand, still there are many, and our Webbs and Browns are sufficient to enthuse many others with the determination not to be outranked. But let us not in our exaltation forget our indebtedness to the many inventive minds who have done so much in the production of instruments and appliances with which to make these beautiful operations possible. Truly, we should remember with gratitude such men as Barnum, Morrison, Wilkinson, and many others, who have not only given time but money for these purposes.

When our next difficult case presents itself, let us stop for a moment and imagine ourselves without the rubber dam, or the engine so indispensable, or with that old chair over which our operations were so wearily performed. The many appliances and improvements comparatively new to us have largely conduced to make us what we are today. But let us not rest here, for doubtless there is still room for improvement. The inventions of the day are too many and too wonderful for us to say that anything is impossible.

INVENTION.

SELECTIONS AND ABSTRACTS.

LOCATION OF THE MENTAL FACULTIES.

Of all the numerous topics which are the common field of the physician and the biologist, none is of as great interest, both in its practical bearings and intrinsically, as a fascinating theme, as that of the location of mental faculties in the brain. Year by year scientific inquiry is narrowing down the question of the existence of the mind into the functional realm of those great masses of nerve tissue, which, filling out the cavity of the skull, have already formed an empirical and unconscious recognition by the ancients when they endowed the Goddess Minerva with a higher brow than Venus, and Apollo with a greater facial angle than Bacchus.

For a long time observers contented themselves with mere measurement of the volume of the brain; a heavy brain was supposed to be capable of higher mental action than a light brain; the elephant and whale were contrasted with the alligator and tortoise, and after bitter contests waged in scientific societies, the conclusion was arrived at that only animals approaching each other in size, as well as zoölogical position, should be compared to obtain data. The original proposition is sustained by the fact that in weight proportionate to that of the body the elephant exceeds the hippopotamus—the dog, the fox—the chimpanzee, the baboon—the marmoset, the squirrel—the rabbit, the kangaroo—and so on through the list. The intellectual standard finds its expression in a greater brain-weight among animals.

Any one who has glanced at the older anatomical atlanti will have been struck by the picturesque folds and festoons into which the brain-surface is thrown. He may compare the folds in the representations of different authors and will arrive at the conclusion that they can have no definite importance, because they differ so absolutely in every diagram examined.

The fact is that these folds or corrugations, familiarly known as the convolutions of the brain, were later recognized to be very methodically and regularly arranged, and to follow a distinct plan for each zoölogical species, including man. The old anatomical masters, ignorant of this fact, allowed their draughtsmen to fill in the details according to their fancies, and these naturally led the latter to pay more attention to the picturesque than the true. Now the contest as to the location of mind in the brain took another form, the opponents

of the materialistic theory, that brain and soul are united, tacitly admitted the general proposition, and orthodox anatomists endeavored to discover as numerous and as decisive criteria by which to distinguish the brain of man from that of the ape as diligent research could unearth. But one barrier after another which they erected has been swept away by their opponents. Owen's claim that the apes had no lesser hippocamp, was demolished by Huxley, the Island of Reil has been demonstrated in animals far below the monkey tribe, the cerebral overlap is recognized to be decided in the anthropoids and in other monkeys as in many human subjects, and even an indication of an opercular formation has been found in defective human brains, while the last criterion, the alleged absence of the "*Zwickelwindung*," in man, has been demonstrated to be faulty by Parker, of Philadelphia.

The great similarity of the chief surface features of the monkey's brain with those of the human, led Ferrier and Munk, after preliminary experiment by Hitzig and themselves, to attempt the isolation of willed muscular movements, and of special sensory perception in the cerebral convolutions of the monkey. The researches of Meynert had shown that anatomically the brain "bark" or "rind" (*cortex cerebri*) occupied the position of a mirror, as it were, on whose inner face abut the photophone wires represented by nerve bundles, transmitting the messages from the outer world. Meynert found that the nerve fibres from the eye, the skin in general, the ear, the nose, and tongue, went to special convolutions, and that to other convolutions went fibres which controlled muscular movements. Now the experiments of Munk and Ferrier confirm the anatomical premise of Meynert, in its general bearings. They found by cutting away a given part of the brain, blindness would result, the removal of another part would be followed by deafness, of still another by paralysis. They and others also established that if those parts whose removal was known to be followed by paralysis, were instead of being injured, stimulated (by electricity) special motions could be produced at will. In other words, these investigators found the keys of the mind before them in the convolutions of the brain, and by touching a special key, were enabled to forge the will signature of the animal, as it were. Special parts of the human brain, when the seat of disease or of injuries, are shown to have similar functions. A man has an apoplectic stroke, or an abscess, or a softening, or a tumor of the brain. If that disturbance is in one part he may be blind in a portion of his visual field, or he may lose the memory of words, or their articulation, or the

ability to write, or he may be paralyzed in one arm, or one leg, or only on one side of his face. If the disturbance is extensive, several of these symptoms co-exist. It is noteworthy that these disease experiments, if we may so term them, confirm the physiological experiments made on monkeys in a remarkable manner, and it seems that the great problem of the relation between brain and mind is nearing a solution through different channels of research, approaching the same goal.

Science, Dec. 17, 1881.

RESTORATION OF THE HEART'S ACTION WHEN IT HAS CEASED TO BEAT.

In the British Medical Journal, Dr. Jago suggests that when the heart fails in cases of anæsthesia, etc., we should prick it with a fine long needle, but gives no cases. The following cases, by Dr. Reid, are interesting. He says : On reading Dr. Jago's article, it reminded me of an experiment in my college days. I do not remember what induced me to kill a mouse by a blow on the head, and rip it open to see the heart beat. It did not. I pricked it with a needle and set it a-going. It stopped after a time ; then I gave it a second prick, and a few pulsations were distinctly seen. When I was in petticoats, my father was sent for to a girl in a fit. He was out, and when he came home was informed of the fact. "How long since? and any second message?" Being told he thought he need not go, my mother suggested he "ought to go," which he did. He found the girl dressed in her grave-clothes, and "laid out" on a linen-covered table. He examined her, and found some warmth over the heart. He ordered hot water to be brought, not scalding hot, and poured it into a jug, tore her shroud open, stood on a chair, and poured a continuous stream of hot water, until the throbbing of the heart was distinctly seen. That girl was the mother of several children before I left Scotland, in 1848. My mother used to laugh, and take her share of the credit of her restoration to life.

An old man here, Robert Robinson, several years before his death, took a fit, and apparently expired on the floor, where he was lying pulseless and breathless. The heart had ceased to beat, and I was told that "he was beyond any doctor's power now." I felt some warmth over the heart, and I tried my father's remedy ; and, to the wonder of spectators, the septuagenarian revived, and lived several years afterward. Hot water can easily be obtained ; and no one can object to such an experiment.—*Braithwait's Retrospect.*

EDITORIAL.

We have been much gratified by the reception thus far accorded to the JOURNAL. No word of discouragement from any source has been received; but, on the contrary, much of congratulation and good cheer has been extended from various sources. Arrangements have been completed effecting the permanency of the JOURNAL, leaving the managers free to devote their best efforts to the realization of what constitutes their ideal of a Dental Journal. Papers from some of the best men in the profession, and also from medical sources, are promised and in course of preparation, upon very important subjects, which will appear shortly. In brief, we expect to make the JOURNAL *indispensable* to the profession.

In this number of the Journal, we introduce a department under the title of "*The Operating Table and Laboratory.*" This department will be under the special supervision of one of our "*Associated Dentists,*" assisted by other members of the corps, who is noted for his mechanical and inventive skill, as well as his success at the operating table, and in the laboratory. He is already the inventor of several appliances of great usefulness in daily use by the profession. His effort in this new field will be to share with the profession, through these columns, the results of his experience and observations, and render such hints and suggestions as will be of special advantage to every operator in both departments of the profession named.

He will be glad to receive any helps from any member of the profession, in making this feature of the Journal a complete success, duly accrediting to the author thereof such assistance.

Let this department, gentlemen, be a sort of *public clinic* (in print) of special methods in practice, new appliances, etc. Cuts of such appliances, or pet instruments, will be of special advantage in illustrating.

We have opened a space for chemical facts and hints that might seem of interest to the profession. We request every one of our readers to favor us with hints and queries; every contribution will be thankfully accepted.

RAMBLINGS AMONG THE MONTHLIES.

The *Cosmos* of January, 1882, opens with an article of general interest, by J. L. Williams, North Vassalboro, Me., on the Beginning of Physical Life. We are sorry, that at very many points—we might say every other sentence—we have to disagree with the author. The passage quoted from Beale, "Every particle of the bioplasm of living matter came from a pre-existing particle," etc., seems to us wrong in this form; at least the sense seems to be, that every particle of "bioplasm" is derived from a particle of "bioplasm" digested or otherwise taken up. This statement is easily proved erroneous. How much living matter or "bioplasm" is in a seedling of a tree? Say half a grain; how much is in the tree? Perhaps some pounds. Whence did this come? Experiments have proved beyond doubt, that the ammonia, the carbonic acid, the water and the salts of the soil can be made to combine by previously present "bioplasm" and to form entirely new "bioplasm;" this "bioplasm" did not pre-exist! This process is furthermore nothing so very unique and isolated as one might think. All chemists know a great number of examples, where the existence of a certain substance facilitates very much the formation of the same substance from its constituents. We only cite the manner of making vinegar by letting a mixture of brandy and water trickle over wood-shavings. If the shavings are new, little vinegar only is formed, but, when once the shavings are soaked with vinegar, the process of producing vinegar goes on rapidly. Or, in preparing certain chlorinated ethyl-combinations the presence of a certain quantity of the substance to be made is almost necessary to determine a uniform process of combination. In over-saturated solutions of any salt nothing produces quicker the separation of the crystals than throwing a crystal of the same salt into the solution. Hence the formation of "bioplasm" is nothing so isolated, without analogies, as the author wishes to convince us; the history of chemistry has taught us to be very careful in announcing a new law, where analogies bind a case to many similar ones, for which we have already either laws or at least a certain principle underlying, which we can already, though dimly, perceive. The synopsis of the germ-history is well given and the cuts show well-prepared specimens and good microscopes. The last twenty lines breathe that narcotic philosophy of the: because *we* do not know it, it is impossible to know it. The author makes a weak point by basing his philosophy on the sentence: "Who has ever been able to trace and connect these changes of a germ?"

etc. Many a philosopher has been wrecked on this supposed inability. But the learned doctor certainly himself feels the immense difficulty of what he demands of a science which is hardly yet weaned, which has still to settle the grosser facts of histology. We confess that we were unable to get anything out of the sentence: "Life is not the cause of the form in organisms,—it is the form itself." We puzzled and worked long over it, but could not make out anything whatever. The last sentence of the article caused us the feeling of ants crawling about within our skull after we had studied a quarter of an hour to obtain a clear and exact idea of what was meant,—without success.

In the proceedings of the American Dental Association, Dr. Litch is reported as giving statistics of Darin about the relative number of deaths caused by chloroform, ether and nitrous oxide. The figures seem to us deceptive and not quite reliable. We may safely assume, that every person in the United States receives in the average one application of an anæsthetic in twenty years. This is certainly below the real figure; this gives 2,500,000 applications of anæsthetics during a year; according to the table of statistics, if all were nitrous oxide, we would have 25 deaths of it during the year,—far above the actual amount! If all were ether, we would have 90 deaths, and in the case of chloroform about 700. The real figures, at least in the case of ether and laughing gas, certainly fall very much short of these statistical data.

We do not know exactly, how far some members of dental societies might be benefited by reading the article in the *Dental Register* of December, 1881: What ails dental societies? Another interesting article in the *Register* is an address of John S. Billing, M. D., On our medical literature. According to it, the most industrious contributors to medical literature are the French doctors, 1 in 10 writing for the papers; next stand the Germans, with 1 contributor to 13 doctors; England has 1 to 17, Italy 1 to 18, Spain 1 to 18, while the United States have only 1 "literary feller" among 23 doctors,—less than Spain! In new medical books for 1879, France leads with 187, Germany being next with 110, while the United States with 21 books rank lower than Italy; but if we include the periodicals and pamphlets, the U. S. rank third with 310 publications; France, with 541, being first and Germany, with 364, second. In periodicals, the United States stand first with 156 volumes, Germany being second with 129, France third with 122, Great Britain with its 54 standing lower than Italy with 60. Of the original articles, most appeared in American Journals—

4781; in French, 4608; in German, 4027, etc. In physiology or scientific medicine, Germany alone produced the majority of all publications—59 treatises and 500 articles,—while only 2 treatises and 24 articles appeared from the United States, in fact only one-half of Italy. It shows plainly that, while the Americans are leading on the practical questions, the theoretical investigations have not received that attention which they deserve. We quote a few interesting passages of the article:

"Speaking broadly, we may say that at present Germany leads in scientific medicine, both in quantity and quality of product, and that the rising generation of physicians are learning German physiology. But the seed has gone abroad, and scientific work is receiving more and more appreciation everywhere.

"Seven years ago Professor Huxley declared that, if a student in his own branch showed power and originality he dared not advise him to adopt a scientific career, for he could not give him the assurance that any amount of proficiency in the biological sciences would be convertible into the most modest bread and cheese. To-day I think he might be bolder, for such a fear would hardly be justifiable; at all events, in America, where such a man as is referred to could almost certainly find a place, bearing in mind the Professor's remark that it is no impediment to an original investigator to have to devote a moderate portion of his time to giving instruction either in the laboratory or in the lecture-room.

"The separation of biological study from practical medicine, which has of late years become quite marked in the literature of the subject, has its advantages and disadvantages. Thus far the former have far outweighed the latter, and both the science and the art of medicine have been promoted thereby. But are not the physiologists, or as I believe they prefer to be called, the biologists, separating themselves too completely from medicine for the best interests of their own science, in that they are neglecting human pathology? In our hospital wards and among our patients, nature is continually performing experiments which the most dexterous operator cannot copy in the laboratory—she is, as Professor Foster says, 'a relentless and untrammelled vivisector, and there is no secret of the living frame which she has not, or will not at some time or place, lay bare in misery and pain.'

"Some societies and editors do not seem to appreciate fully their responsibility for the articles which they accept for publication—a responsibility which can not be altogether avoided by any formal

declaration disclaiming it. This is due to the fact that while the merits of a paper can usually be determined by examination, this is by no means always the case. In every country there are writers and speakers whose statements are received with very great distrust by those best acquainted with them. Supposing these statements to be true, the papers would be of much interest and importance; but the editor should remember that a certain number of readers, and especially those in foreign countries, have no clue to the character of the author, beyond the fact that they find his works in good company. In medical literature, as in other departments, we find books and papers from men who are either constitutionally incapable of telling the simple literal truth as to their observations and experiments, although they may not write with the fixed intention to deceive, or from men who seek to advertise themselves by deliberate falsehoods as to the result of their practice. Such men are usually appreciated at their true value in their immediate neighborhood, and find it necessary to send their communications to distant journals and societies in order to secure publication."

The January number of the *Dental Register*, besides introducing itself as a monthly journal, is full of interesting articles. "Wheat Phosphates" is an article of William S. Daffin, M. D. With great skill the author has compiled various sayings of doctors to the effect that there is "something" in natural mineral waters, "something" in natural phosphates, etc., which shows our old friend "vitalized" food looming through the fog. As a sample of new words, invented without any necessity, I mention the "organismal phospheide," as the author designates a certain compound! The difference between wheat phosphates and common phosphates is nothing mysterious. In wheat the phosphates are in combination with gluten, hence when the gluten is dissolved the phosphates are assimilated; while the natural phosphates are often worthless, because they are not given in proper union with albuminous substances, hence of as little use as the phosphates in the urine. In spite of disagreement in some of the more theoretical points, we fully indorse Dr. Daffin's good opinion of wheat and its phosphates.

In the *Independent Practitioner* for January the question of animal or human virus for vaccination is treated by giving the results of a paper of Dr. E. R. Warlomont of Brussels as published in the British Medical Journal. The author declares himself in favor of animal virus.

In the *Ohio State Journal* E. S. Talbot, M. D., D. D. S., gives experiments on amalgams and mercury. To treat them simply here shortly and without entering carefully upon details, "would not do." We propose to do it thoroughly in our next number, and Dr. Talbot may expect criticism. According to the transactions of the Illinois State Dental Society, quite a lengthy discussion followed the paper. Some of the remarks made there seem worthy of being entered into carefully. In this number we send in Dr. F. Searle to open the battle. He is strong enough to win the first fight, which is on the ground of long special experience extending over forty years. Dr. Searle is not only a widely known prominent dentist, but also a man of clear unbiased reasoning.

OUR INTERVIEWS.

We hardly had read that enlightening article in the *Ohio Journal*, of January, 1882, about the mercury of amalgams blackening slips of paper stained with ammoniacal silver solutions, about its oozing out through the skin and the fingers, its direful effects when put into the mouth in the shape of amalgams, etc., when, troubled about our own chances in the insurance company we were just then negotiating with, and of millions of similar amalgam-affected people, we rushed into the office of Dr. Searle to ask—almost out of breath—a few questions. The answers calmed us materially, and for the benefit of similarly affected ones we give them here:

Q. How long has amalgam been used as a filling for teeth?

A. In this country about fifty years; in England somewhat longer.

Q. How long have you used it?

A. I commenced using it about forty years ago.

Q. What kinds of amalgams were then generally used?

A. Those made of silver (either precipitated or filed from coin) and mercury; a few years later, those made of silver and tin, in varied proportions; silver containing a small per cent. of platinum was used for a time, but abandoned—this was previous to 1850.

Q. What is your opinion of amalgams in general?

A. Taking into account their applicability to a large class of frail teeth where no other filling could be used, also the fact, that their cost brings them within the reach of those who cannot pay for gold, I consider them indispensable to the greatest usefulness of dental operations. After becoming superficially sulphurized in the mouth,

their color is objectionable. Practically they may be the better for the black and brown coating of sulphides, as they are insoluble in the normal liquids of the mouth.

Q. Do you think that a dentist, because he makes an amalgam-filling for less money than a gold-filling, may not do equally good work for the patient?

A. The essential work consists in carefully preparing the cavity, and a conscientious dentist would do that just as well for an amalgam as for a gold-filling; he will take the same time in both cases and cannot do this part of the operation any cheaper in the case of amalgam than in that of gold-fillings.

Q. Were you familiar with the earlier discussions of amalgams as a dental filling?

A. Yes. The controversy was carried on for several years through the New York papers and dental journals, extending down to about 1860.

Q. Did you ever meet with a case where the mercury of an amalgam produced salivation?

A. No; not in my own practice or observation.

Q. Did you ever meet with a case of any systemic effects of mercury produced by amalgams?

A. No.

Q. What do you know of the experience of other dentists concerning the effect of the mercury in the amalgams on the system?

A. I have read published reports of constitutional disturbances, supposed to have been caused by the absorption of mercury from amalgam-fillings, most of them very inconclusive, and admitting of other explanations.

Q. Do you think it possible, in view of your own experience, that cases of death from the mercury in amalgams, as reported, were rightly diagnosticated?

A. I do not.

Q. Were you acquainted with the case of the late Mr. N. P. Ames, about which much was said and written several years ago?

A. I knew Mr. Ames and operated for him after his return from Europe. He told me his experience with amalgam-fillings when in London and Paris.

Q. Will you state some of the prominent facts as told you?

A. Mr. Ames had some large amalgam-fillings put into his teeth in London. Soon—I think a few days—afterwards, he went to

Paris. When the remains of Napoleon I. were brought back from St. Helena, Mr. Ames was out to witness the procession. He was obliged to stand for several hours, five, I think he said, upon a fence or some elevation in the rain, surrounded by a crowd so large and compact that he could not leave his position. When the crowd dispersed he found himself so benumbed and rigid that he had to be carried to his hotel. His London physician told him that the amalgam-fillings caused his trouble, and he had them removed. After his return home he was under the care of his family physician. He lived an invalid several years after his return. His physician, Dr. Bemis, in a letter to the editor of the *Dental Recorder*, emphasizes that he never dreamed of attributing his illness or his death to amalgam-fillings, or to any operation whatever upon his teeth.

Q. Are you able to distinguish a "metallic odor" in the mouth in the cases of amalgam-fillings?

A. What do you call "metallic odor?"

Q. I am entirely unable to say what it is, or how it smells; the only metal I know which has anything like a peculiar odor is tin,—iron, copper and lead only under special circumstances—though I do not know why the odor should be called metallic; it is an odor, and that it comes from a metal is not perceived by our nose, but by our eyes, and in many cases by our fancies. Mercury is entirely without odor, as I convinced myself by breathing the vapors of mercury at all degrees of heat,—by the way, without the least systemic effect.

A. I have never suspected the odors of the breath having a metallic origin.

Q. Did you perceive, or did the patients complain of, any odor or taste in the case of tin-fillings?

A. Yes,—more of the taste, perhaps, which I should define as resembling the sensation one experiences if one pole of a battery touches the tongue and the other some other part of the body.

Q. Which metal besides silver and tin—and of course mercury—do you think most beneficial in an amalgam?

A. Gold. Perhaps its chief effect is on the color; it makes an amalgam whiter and harder.

Q. Did you get any good results from platinum in amalgams?

A. I do not like it.

Q. Has cadmium been combined with other metals for dental amalgams, and with what effect?

A. Dr. Evans, of Paris, introduced it into the practice. He spoke

very highly of it at first, but afterwards he retracted his first opinion of it.

Q. What were the disadvantages of cadmium?

A. It produced a yellow deposit in contact with the tooth, and destroyed itself.

Q. The yellow deposit is no doubt sulphide or oxysulphide of cadmium, both of which are yellow.

A. I could give you the opinions of many men in the profession with regard to the harmlessness of amalgam-fillings, e. g., Dr. Elisha Townsend—as published in the News-letter, Philadelphia, vol. XI., 1857. He says: "I wish it fully to be understood that I advocate amalgam-fillings in the practice of those who receive liberal recompensation for their time and skill, only in such cases as would otherwise have to be extracted. I have seen hundreds of mouths in which amalgam-fillings have been placed, some recently, and several others years since, and have never in any case seen any injurious systemic effect." Quacks and charlatans using his name in their interest he felt so annoyed, that in the volume of the same year he declares that he never will use amalgams any more, for the following reasons: "In many cases in which they are most relied on as a filling, as in the buccal cavities of molars, when beneath the free margin of the gum, while some remained clean, in many cases there occurs a blackening on the underside, and that color is given to the tooth. Again, in infirm teeth, for which they seemed the only thing, many have to be removed, owing to suppuration of the gums, caused by the tight closing of the previous vent for the escape of the pus. Therefore I have come to this broad conclusion, that teeth so infirm as to need soft fillings would be best removed for the health of the patient." No one can fail to see the flimsiness of the reasons given for not using amalgams.

HINTS ON THE CARE OF THE TEETH.

We find in one of our neighboring dentist's office the following "Hints on the Care of the Teeth," which we are kindly allowed to make use of in the *Journal*. They are printed on folded cardboard in a very neat and tasteful manner, and the Dr. says that it saves him a great deal of time in *lecturing* certain patients, especially children, on the needed care of the teeth. He gives them out requesting the patient to take them home, and hang them up in some prominent place in their sleeping rooms, where they may serve as a reminder of

their duty to their teeth, just at the time when they most need attention. The "Hints" are as follows:

Cleanliness is of absolute importance, and its neglect cannot be atoned for by dental skill.

Thoroughly cleansing the teeth each night before retiring is ordinarily sufficient, and no other cleansing should excuse it at this hour.

The articles necessary to its thorough accomplishment, are the brush, pick, tape, silk or linen floss, and tooth-powder, or prepared chalk.

The brush to accomplish its purpose, should be given an upward motion on the lower, and downward on the upper teeth, and no portion of any tooth should escape its action.

The passage of the floss or tape between the teeth is essential to the cleansing of their approximal surfaces.

A rightly trimmed quill pick is needful, especially after eating.

Children's teeth require daily cleansing by some competent person from the time they commence to take solid food.

For tartar or other special conditions, consult your dentist.

Compliance with these suggestions, not only conduces to the elegant appearance of the teeth, but to the least possible demand for dental operations.

One of the most prominent dentists thus closes his letter to us: "Well, success to the N. E. Journal. There is abundance of room for there is a multitude of dentists who are fully up abreast of progress, and they need a journal that shall discuss other things than vulcanite and amalgams—that shall not fail to recognize TRUTH in whatever garb she may appear, nor cease to worship her though she may ruthlessly rend to tatters the cobweb framework of our very dearest cherished theories."

We recommend to all dentists, who are not more or less skilled tooth-workmen, the reading of the article on albuminoids in this number of the JOURNAL. Much vague talk about teeth might be avoided if dentists knew about these substances.

If dentists must use tobacco, let them try Dr. C. Graham's deodorizing mouth-wash, made as follows: To a table-spoonful of water add twenty to thirty drops of bromo-chloralum. It is said to work like a charm, being odorless itself, yet destroying instantly the after-effect of the weed upon the breath.—*Selected.*

Operating Table and Laboratory.

THE USE OF MATRICES IN FILLING TEETH.

About ten years ago, Dr. Louis Jack, of Philadelphia, invented a system of matrices for use in filling the approximal cavities of molars and bicuspids, and though they were advertised to a considerable extent at the time, we do not think they met with the favor they most certainly merited. It would seem difficult to conceive of an operator being without them who has once acquired their use, and become convinced of their real worth. Though it may not be possible to very largely introduce those invented by Dr. Jack, and for sale at the dental depots, it may be possible to induce the profession to use a modification of the same, such as the writer has been using for some years. Those invented by Dr. Jack, we infer, were designed for use in filling with gold, though possibly as well with other filling material.

In our own practice we receive the greatest assistance from them in filling with amalgam, and especially in those cases where decay has extended far under the margin of the gums. All that is required in the construction of these appliances, is the uncut ends of separating files of different thicknesses, or any metal plate of the requisite thinness and stiffness, to which the amalgam will not adhere. They should be cut in form somewhat like the letter D. The curved edge, which is designed, if necessary, to slip under the margin of the gum, should be beveled off to a somewhat sharp edge, and the plate bent to fit around the tooth, giving all the prominence desired to "knuckle out," if that object is in view. Place in position, forcing as far up as required to nicely cover the curvical wall of the cavity, and retain in position with a common orange-wood wedge, or, if the adjoining tooth is missing, with a block of wood sufficiently large to fill. The matrix should not be so wide as to prevent ready access to the cavity. It is well to have several at hand, of different widths and thickness, that any case may be readily fitted. It is surprising how free from moisture these appliances will keep a cavity, even without the rubber dam. In these large approximal cavities, extending through the grinding surfaces of the teeth, we feel assured that but few amalgam fillings are thoroughly packed. Either the material is left too soft and pasty for a good filling, or, on the other hand, the filling is very porous. In either case, the operation is stamped failure.

With the matrix method, the amalgam may be mixed very dry, and

packed with the mallet. The result is a filling so dense that a very good finish can be given at the same sitting, and that will merit confidence. Try it, and be convinced.

RESETTING PLATES.

Let me tell Dr. Benjamin of a still better way to reset rubber plates where the absorption requires a new plate. We often insert full upper or lower dentures in from three to eight weeks after extraction, and find that in many cases the patient desires the same expression and articulation in the new plate as in the old.

If he will with a small bur cut out the rubber from the inside of his plate thoroughly, to the depth of at least a line, and line the plate so cut out with a thin covering of extra soft modeling compound, and warm the case, he can insert in the mouth, and while the material is yet soft, get exactly the same bite as before. Then on withdrawing it he can trim off the edges and find a surer impression than is possible with wax. Now let him insert the plate in the lower half of a deep flask, at an angle to insure its "drawing," fill with plaster around the plate flush with its edges, silix his plaster or oil it if that's his way, and fill upper half very carefully. Steam thoroughly, and on removing, save every atom of modeling wax, and measure it in your rubber measure. Cut waste gates by filing little channels in edge of band. In packing the case, use just the amount of rubber your wax measures, as this is the secret of perfect closures and no checking of blocks. If you want to use an air chamber, put it on cast as usual, and cut out a piece of rubber same size, and subtract it from amount of measured rubber.—C. J. Rathbun, in *Items of Interest.*

GUTTA-PERCHA.

Dentists occasionally complain of gutta-percha swelling or bulging from the cavity. This is no new thing; gutta-percha will so act in many mouths in *living* teeth, *never* in dead teeth. Line all your cavities with some resinous substance; rosin dissolved in ether is well adapted. Use a small pencil brush, dip in the fluid to fill the dental tubuli, and you will have no further bulging. Work your gutta-percha with as low degree of heat as possible. Manipulate your filling until you are convinced that it is sufficiently chilled, then remove all superfluous material. I have known teeth partially filled with gutta-percha capped with gold to burst from no other cause than the acids in the dental tubuli acting upon the gutta-percha.—*Herald of Dentistry.*

Chemical Facts, Hints and Queries.

GYPSUM

is so much used by dentists that a little sketch about its nature, etc., might seem of interest. The sulphate of lime or calcium sulphate or calcic sulphate or gypsum, all of which designate about the same substance, is a combination of sulphuric acid and caustic lime, as the old chemists called it; or it is a sulphuric acid whose two hydrogen have been substituted by the bivalent element calcium—this is the present view; the old formula—without any water—was $Ca\,O\,SO_3$, the new one is $Ca\,S\,O_4$. This compound exists in nature under the name of anhydrite; it may be obtained by melting common plaster; it is hard crystalline and when pulverized, it does not harden with water. In the incrustations of boilers there occurs a compound precipitated from the hard water with 6 per cent. crystal water, *which does also not harden* with water. The common gypsum is the substance with 21 per cent. of water. This gypsum occurs at many places, though chiefly near Paris, where there are great quarries for it; this gypsum when gently heated to 132° Centigrade (266° F.)—loses its water and afterwards may take it up again, hereby assuming crystalline structure, while the water becomes solidified into the "crystal water." This property is what we make use of in making the plaster-casts; theoretically about one-fourth of the weight of plaster of Paris should be taken as the amount of water to be mixed with it—exactly 27 per cent.—but as this is not very easy to mix, generally a little more is added which has the effect to make the casts a little softer, though by evaporating afterwards it does not permanently injure the hardness. Too much water "drowns" the plaster; it assumes the crystalline structure without allowing the crystals to become interwoven because of the water between the crystals. Plaster heated to 204° C. (399° F.) does not take up water quickly at common temperature and does not harden at all. Many substances hasten the hardening of the plaster and render it harder. The best of them is sulphate of potassa, the casts are very smooth but unfortunately they do not resist the action of boiling water; the water will dissolve away the sulphate of potassa, and the remaining hydrated gypsum is frail and porus; far less advantageous are other admixtures like glauber salt, common salt, etc.; all kinds of potassa salts—e. g., potassa-alum, hasten the process of hardening, while soda-salts are almost indifferent; plaster mixed with tartarate of soda-potassa (seignette-salt) and

water hardens almost instantaneously. Where plaster has to be exposed to the action of hot water, it is best to use no admixture all, to mix the plaster relatively dry and to use plaster that has not been exposed to air—chiefly if moist—for too long a time. By experiments we found that plaster in an open paper bag took up in one year, in a medium dry room, 5.7 per cent. of water and hardened but slowly and imperfectly; after being entirely deprived of this moisture and being allowed to stand for 5 days in an open vessel in a damp room, it took up 2.3 per cent. of water. The essential condition for good plaster-casts are therefore :

1. Finely powdered plaster;
2. The plaster properly calcined;
3. The water well mixed with the plaster;
4. Avoidance of too great an excess of water;
5. Protection of the plaster against access of air and moisture before its being used;
6. If the casts are steamed, admixtures of salts should be avoided.

The mineralogical names are: Anhydrite for plaster without water; alabaster for the pellucid variety with 21 per cent. water; selenite for the mica-like variety with 21 per cent. water; gypsum for the rock-plaster with 21 per cent. water as found at Montmartre near Paris, etc.; the term plaster of Paris should be used only for the calcined gypsum before it has been used for casts. M.

We mentioned in our last number the fact that not only acids dissolve lime salts but even natural and alkaline liquids. We made a few experiments with sugar as to its solving powers for lime salts and found that it was lower than supposed, e. g., in Gmelin; 1 part of carbonate of lime required at least 8,000 parts of solution of sugar for its dissolving. But this does not alter the fact that the lime-salts are soluble in many neutral liquids. M.

On examining some of the powder known as "Vegetable Sozodont Tooth Powder," I found it to be composed chiefly of diatomaceous material, the forms being in both perfect and fragmentary states. The other constituent seemed to be some flavoring matter which gives the powder its peculiar taste. Various forms of *Navicula* and *Pinnularia* occur in great abundance. Also small and delicate forms. When mounted in balsam, the powder makes an interesting object.—C. W. G., PALASADES, N. Y., correspondence of *American Monthly Microscopical Journal.*

SOCIETIES.

At the Annual Meeting of the Mass. Dental Society, held in Boston, December 8, 1881, a Committee on Resolutions was appointed who approved and adopted the following:

Resolved, That we, the members of the Mass. Dental Society, have heard with regret the sickness and death of our Honorary Member, *Joshua Tucker, M. D.*, of Boston, known to us many years as a *faithful dentist*, a *loving friend*, and a *conscientious* and *upright man;* and although his years were many, his life and conversation had in it the charm of a spirit endowed with the freshness of youth.

Resolved, That so faithful a life, and one so full of earnest purpose, is a bright example for our practitioners and the youth of our land to follow; for, by so doing, they will receive, as he did in his later years, the applause of wise and good, and the satisfaction of his own heart and conscience.

Resolved, That we extend our kindly sympathies to his widow and to his relatives and friends in the time of their bereavement, and we trust that the immortal part of him has entered into the higher life of which he was a firm believer.

Resolved, That these resolutions be sent to the family of the deceased and a copy of them entered on the record of this Society.

(Signed) D. B. INGALLS, *President.*

W. E. PAGE, *Secretary.*

J. T. CODMAN,
I. J. WETHERBEE,
EDWIN P. BRADBURY, } *Committee.*

In societies that have recently adopted a system of dividing *the work* annually among the membership into sections, there exists among some of the members, who, not being acquainted with the system, a misapprehension as to what is expected of them. That is, if they are unacquainted with the method, they expect by the notice sent them of assignment to a certain section, that something imperative or positive is expected of them in the shape of a paper, a report, or something definite to be presented at an ensuing meeting. Now, while this is to a certain extent true, and that *all* members are earnestly and cordially called upon for some contribution, be it large or exceedingly small—which, if the latter, may be embodied in a general

report by the chairman of the section that would come properly under the head of their respective sections, it should be at the same time understood that there is nothing obligatory about it.

It should be understood that there is nothing more expected of those who cannot or who are unwilling to make reports, or write papers, than there was expected of them under the old and thread-bare system of a half dozen members doing *the work* for a society with a membership of from one hundred to two hundred, unless it is that they are cordially invited to attend the meetings and get acquainted with such progressive work as they now do not understand.

It should be understood that when the American Dental Association first adopted this system—that works so beautifully now—some sections were passed without any report *at all.*

It should also be understood that this plan succeeds as well in small societies as in the larger ones, because the principle is right. Some of the district societies of New York State have adopted and admire this method of work.

It would be well if all members of Dental Societies adopting this plan of division of the work into sections, could feel concerning it at the beginning as they certainly will when the subject is comprehended; and the best way to understand and appreciate this excellent plan is to attend the meetings of *live* societies. The presence of members is worth very much, even if some choose to take no active part in the proceedings of the meetings.

[*CORRESPONDENCE.*]

In reply to Prof. Mayr's criticism of the discussion of Dental Caries, at the American Dental Convention last summer at New York, as one of the participants of that discussion, I will say that Magitot's experiments prove that sugars, *as such*, do not dissolve out the lime salts of teeth. It is true that the carbonate of lime is held in solution to a considerable extent by ammonium chloride, and it is also true that *ammonium chloride will not decalcify bone or tooth substance.* I have yet to see a cavity where dental caries is in active progress that does not give a distinct acid reaction when tested with litmus, and have never seen one that was alkaline or neutral, except when caries was arrested and the pulp had made an effort to solidify the circumscribed portion of dentine about the cavity. All of which inclines me to surmise that even professors are sometimes tempted to "*theorize.*"

E. S. NILES, Boston, Mass.

PROSPECTUS.

First.—We believe that there is a promising field of usefulness in New England for a wide-awake, wisely-conducted Dental Journal. We believe, also, that the facilities, and a sufficient amount of concentrated energy and determination are at our disposal to warrant us in undertaking the responsibility of meeting this demand.

Second.—We recognize the fact that, to a greater extent than ever before, the dental profession "is imbued with the spirit of *original investigation;*" that never before has there been so earnest a demand for *absolute facts and scientific exactness*, in place of careless statement, fanciful theorizing and undue reverence for venerable authorities. In view of which, we have secured the services of an eminent and broadly educated scientist, not only to preside over this department of the Journal, but to work with us in a systematic review and sifting of the accepted basal principles of dental science and a diligent and organized search for such new truths as the rapidly advancing and broadening fields of the sciences in general may have in store for our specialty. Results from this source will be promptly communicated through this Journal.

Third.—The "Associated Dentists," who comprise the general editorship, are all actively engaged in the practice of dentistry, and are entirely independent of all alliances and ambitions other than the best interests of the profession in its highest sense.

Fourth.—It is hoped that the dental profession will make free use of these columns as a ready means of intercommunication. Consider it, gentlemen, as your own, and take an active interest in it. We especially call the attention of Secretaries of Societies to this point, and hope they will act upon it.

Fifth.—While we are domiciled in New England, and assume our name as a convenient one to distinguish this from other Journals, we nevertheless aspire to the plain of making our influence felt for good, in common with so many other New England institutions, throughout the entire land.

Sixth—We earnestly solicit the aid of the profession in subscriptions, and original contributions, incidents of practice, etc., promising, on our part, to exert ourselves to the best of our joint ability to realize your ideal of a dental journal.

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THE

NEW ENGLAND

Journal of Dentistry

AND

Allied Sciences.

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ORIGINAL COMMUNICATIONS.

DENTISTS AS SPECIALISTS.

Presented to the American Academy of Dental Science, at the Fourteenth Annual Meeting, October 26, 1881.

BY GEO. L. PARMELE, M. D., D. M. D., OF HARTFORD, CONN.

In the Code of Ethics of nearly every Dental Association in the United States, under the heading, "*The Relative Duties of Dentists and Physicians*," appears this assertion: "Dental Surgery is a specialty in medical science. Physicians and dentists should both bear this in mind." Although the idea, as expressed in this extract from the Code, *ought* to be true, and I sincerely trust the day may not be far distant when it will, I beg leave to declare that in my opinion dentistry as now practiced by the majority of dentists is not a specialty of medicine. Surely a profession or art in which one-eighth of the practitioners are graduates of dental schools, one-eightieth, perhaps, graduates of medicine, and the balance (about three-fourths) possessors of no degree either academic or scientific, has no right to claim equal standing with a profession whose members, with a few exceptions, have a scientific education and graduation. I would not have you think that I place a light estimate upon the rapid growth and improvement

In neuralgic cases, where the chlorotic diathesis is prominent, accompanied by an irritation of the nerve centers, indicated by a contracted pupil, etc., we have found gelseminum an invaluable remedy, acting very speedily. Such cases more or less frequently present themselves where the pain is located about the teeth, usually on the left side, especially during the night time, and, quite frequently, where there is no local lesion whatever. Local treatment is, of course, out of the question. Such cases are quite common with girls in their "teens." Our prescription has usually been about ten drops of the tincture to four ounces of water, and a teaspoonful every one or two hours, according to the severity of the case, and age of the patient.

In general medical practice much larger doses, say from two to ten drops, are sometimes given, but in our experience the *accumulative* effect, gained by the administration of fractional drops, has resulted the most favorable. Thus given, marked effects must not be anticipated under twelve to twenty-four hours; but they are more permanent and satisfactory. If the patent "air brakes" are applied to a highly speeded train in their full force, suddenly, a shock will result, if nothing more; when, if instead of the full force of the brakes applied at once, it is made gradual or accumulative, the train is "slowed up" safely. So with this sedative as applied to the human "train," under an abnormal and dangerous speed—unless the abyss ahead is *immediate*, "slow up" gradually and not too suddenly.

We regret to say that the tincture, usually obtained at the drug-stores, is unreliable and often entirely inert, and that where this is not the case, it is of varying strength; consequently, we are convinced that much of the condemnation visited upon this remedy is attributable to this fact. That which is labeled "*Specific Medicine*" is found to be most reliable and the strongest. We have also found Park, Davis & Co's preparation uniformly good. That this remedy has an important place in dental therapeutics, if rightly used, we fully believe after using the same for several years.

The Sixth Annual Meeting of the Vermont State Dental Society will be held in the parlors of the Van Ness House, Burlington, Vt., Wednesday, March 15, 1882, commencing at 7.30 P. M., and continuing through Thursday and Friday. The programme is a good one, and prominent members of the profession from other States are expected to be present and take an active part.—ED.

VITAL FORCE—HOW PRODUCED AND HOW DEGENERATED.

Vital force is transformed physical and chemical forces, and this transformation requires the previous existence of living matter. Consequently, we derive our vital force from the decomposition of food and tissue.

When anything is produced, it is done through the decomposition, alteration, or change in something already existing. Vital force and vital structures are as dependent upon this principle of nature as any other forces or structures. As fire consumes fuel to produce heat, so life consumes food to produce life and energy. Bone and muscle, brain and nerve can be produced only out of equivalent material, and the forces necessary for their production must have existed in previous material. Food, oxygen and water enter into the human organism; food undergoing change, whilst oxygen, after uniting with the food and causing decomposition, remains unchanged—water being the medium by which elementary material is conveyed to all parts of the body.

Some of the Results of Imperfect Alimentation. — Predisposing causes, although remote, are far the most important, because without them the other causes would not be likely to exist. If the organism were not predisposed, if its vital resources were not depleted, and its instincts rendered abnormal by bad habits, the exciting causes would seldom be brought into operation, or the proximate causes be made to exist. The proximate or existing causes, those which are immemediately connected with the disease, are necessarily the result of the doings, habits or conditions of the patient, while the exciting causes stimulate these into operation and precipitate disease. The proximate causes: obstructions existing in the body, as the immediate cause of disease. They are proximate, because they are immediately connected with the functional derangement; and existing, because they are found in the body as existing facts. They are found in the blood as irritants, commonly termed impure blood—the sequal, congestion, from an unbalanced circulation, ending with deficient nutrition.

Irritation presupposes an irritant. It may be contagion vivum, poisons, improper food, alcohol, tobacco, retained excretions. The remote causes, although preparing the organism for the onset of disease, do not necessitate it. The conservatrix naturae accommodates itself to existing conditions, and it may take a life-time before there are obvious signs of disease. People should realize that, though

a habit does not make them immediately sick, it prepares them for sickness. Food, *per se*, had a prior existence in organized matter; hence, the fallacy of laboratory prepared food. One of the greatest errors of our day, is that certain inorganic substances can be received directly into the system and become a part of the living tissues, viz: vitalized phosphates, phosphoric acid, iron, potassa, lime, magnesia, etc.

Vital power possesses one quality over all other forces; that is, to transform one vital substance into another, in a manner beyond the reach of the chemist. Who pretends to know how to change vegetable matter into bone, muscle and brain? Nothing like any of these can be produced artificially. Yet chemistry, on the subject of digestion and assimilation, demonstrates what are the elements of food, and also the composition of the tissues.

Finally, avoid superfine flour as you would malaria, because it starves every tissue and fluid. The children of this generation, more especially in New England, are prone to the nervous temperament, either congenital or acquired, brought about in a measure by remote causes, one of which is impoverished blood. There are other causes, but space forbids. No wonder that our boys and girls should be unbalanced and undeveloped—more brain than legs; small bones and thin small muscles; imperfect teeth, precocious intellects, etc. Add to this a diathesis, and we have a compound of abnormal defects which requires the aid of the physician, dentist and surgeon to assist the inherent powers to remedy the evil, whether it be one excess, defect or perversion. Excess and defect have especial reference to the circulation of blood, in a part, to its sympathetic innervation; and to its nutrition, perversion may be of these, but also of the more obscure factors of life. If you have either of these conditions in the teeth, would you administer the artificial phosphates? We think not. So far as dentists are concerned, if their journals are criterions, we may safely say that they are the peers of the medical profession in therapeutics. You would medicate excess or defect. This controlled, you would administer the organized phosphates, the entire wheat flour as prepared in nature's laboratory.

WM. H. VINEY.

Keep your gutta-percha in glass bottles well corked. Gutta-percha contains more or less fat which in time is evaporated by exposure, deteriorating its quality.—*Herald of Dentistry.*

DR. TALBOT AND HIS EXPERIMENTS WITH MERCURY, AMALGAMS, ROACHES, ETC.

BY CHAS. MAYR, A. M.

Already in the February number of the *Journal* we proposed to enter upon some of Dr. Talbot's remarkable conclusions, etc., in his paper: On the Effect of Mercury in Amalgam-Fillings, as published in the *Ohio State Journal*, January, 1882. The paper first gives a good synopsis of the grossly chemical facts about mercury. Thus far we agree with the author. But there comes a "Wort zur rechten Zeit!" He says: "The better class of dentists waged war against it (amalgam) on general principles, not alone on account of the deleterious effects of the mercury in its composition, but because of its unsightly appearance and demoralizing effects upon the dental profession." Let us never lose sight of the necessity to separate completely "demoralizing effects upon the profession," and "deleterious effects of the mercury." Let us be honest, and consider exactly why the best practitioners think amalgams demoralizing and are then easily persuaded into their harmfulness. We need not enter into details; every dentist understands the point of "demoralizing," but let not *truth* get demoralized together with the pocket-book. Each point has to be settled alone without reference to the other. We grant to the author the unsightly appearance of amalgams—where they are seen; we admit to him their "demoralizing effect," though we might rather call it "depressing effect;" we think this quite a good and legitimate ground upon which to fight amalgams; but his assertions about the physiological effects of the mercury in amalgams we have to declare as chemical and physiological superstitions.

We notice with pleasure the scientific statement: "The rapidity with which the evaporation of mercury takes place depends upon the amount of heat and the surface exposed, and not upon the quantity of mercury in the filling." This is perfectly correct. Another point to be mentioned as correct is, that after three months' standing no weighable amount of mercury had evaporated from an amalgam. Dr. Talbot only confirmed still more an old observation. His experiments again are quite correct, and no flaw can be found in these fundamental facts; it is well known that mercury vapor is strongly condensed on gold, and one might even object to this rapid condensation as creating unnatural conditions. But, as we will have to show that the experiments had less to do with the amalgam question than with a new process of making black designs on paper, we will

not pick up trifling objections here. If Dr. Talbot had left off the rest of his paper after having related his experiments, it might have been a good lecture ; but, by trying to draw conclusions from these experiments, he proves that reasoning soundly and making good experiments are two entirely different things. Dr. Talbot is—speaking scientifically—a good stone-gatherer, but as soon as he tries to make a building with these stones he gets nothing but a shapeless heap.

His assertion : "I am in possession of numberless cases of poisoning from mercury in amalgam-fillings," in this general dogmatic form, can be answered only by one thing : "Doctor, your fancy is very powerful !" He reports a case from the *Dental Register*, 1872, based solely on the saying of two doctors. If *they* agreed that "he was suffering from the effects of mercury, present in the amalgam used in filling one of his teeth," does that prove the very least? The whole story of the doctors and the jury reads so "popular," so utterly unscientific and worthless, that we wonder how Dr. Talbot for a moment could take stock in such a vague statement, if it was not because it suited his idea. We would believe the story to be correct, if at least several hundred thousands of deaths or severe mouth diseases of the same character were reported. But does the doctor really think because an ignorant jury ascribe an œdema glottidis to mercury in amalgams or to the man in the moon, that this proves much for either case?

Just as worthless as such *isolated*, more than doubtful, cases are quotations from authors without sufficient reason to apply them to the point under discussion. No doubt Dr. Bartholow is all right in ascribing to mercury as inhaled, "wasting, ptyalism, etc," but he speaks of gilders and others, hence of people who inhale quantities, many thousand and thousand times more than can ever evaporate from an amalgam, which as Dr. Talbot says did not lose a "weighable amount of mercury in three months." Just the quoted case from Walter Pope, of a workman who had not handled mercury for six months and yet rendered a piece of copper as white as silver, if true, proves that enormous quantities of mercury may be stored up in the body—as most experimenters agree, in the shape of metallic globules —without killing the man. Quite perplexing reads the statement :

"Is it not a reasonable supposition that, if poisonous symptoms are produced in proportion with the subdivision of the particles of mercury, that the system will be more severely affected by the vapor of

mercury, which is finer than any mechanical subdivision?" Of course, doctor, of course! What we have to dread are not so much those six-grain doses of mercury, but those *one* quintillions of grains; they kill! And, furthermore, applying the same sound (?) logic to our dangerous amalgams, the smaller the amalgam the more finely subdivided the vapors from it by being mixed with more air, hence the more dangerous and by simple consequence—doctor, we do not joke!—the amalgam, most approximating nothing, will give off the highest dilution of vapor, hence be most powerful and dangerous; therefore, chiefly those cases where the amalgam plugs have very small surfaces will be dangerous—granting for one moment Dr. Talbot's supposition about those mercurial vapors!

This great danger from those microscopically small amalgams in comparison with the larger ones, as would follow from the basis of Dr. Talbot, receives a kind of support by the story of the crew of the "Triumph," where in spite of the mercury coating all the metal about the ship, only "nearly all of the crew were salivated." Surely, if only one-millionth of a grain had evaporated they all would have died! We only wish to prove ad absurdum a most fanciful, hypothetical, inconsequent way of thinking, as the one is that, the higher the peculiar trituration of homœopathic drugs, the better the effect. This bottomless hypothesis, dating from a time when all about chemistry and physiology was ignorance, unfortunately still now and then takes hold of people of fanciful disposition. We do not wish to be understood that we delare all homœopathy erroneous; there is a certain limit for all drugs upward and downward. The man who prescribes above the physiologically required limit, is an unscientific, dangerous quack; the man who prescribes so far below the exactly required quantity that it has no effect, is an unscientific, superstitious enthusiast, who may be dangerous by neglect. Practically, it is true, if we have to choose between either of the extremes, we rather wish to die naturally without drugs than be killed by drugs, hence we would rather have a "homœopath" than an "allopathic" quack; but scientifically both extremes are equally wrong; the really scientific doctor is in the position of the painter asked what he mixed with his colors to give such fine effects. "Brains!" was the answer. This is the most valuable drug known, but the friends of the ℞. will not always find it among the prescriptions, be it of a "homœopath" or "allopath."

But let us once more turn to Dr. Talbot. He makes experiments

on roaches and mercury and amalgams. Though we have to feel sorry that a high dilution of mercury-vapor destroyed their scientific thirst, yet we would suggest to repeat the experiments, enclosing the roaches *with some food* in the bottle, lest wicked people might say we starved them, while we tried to kill them by mercury. How accidental some of those death-rates are, is shown by the fact that in the same bottle one roach outlived the other by seven days. Those experiments prove nothing even thus. A roach is brought in close proximity to a large quantity of mercury; a roach weighing probably not five grains is surrounded by ten grains of mercury. As the doctor applies his experiments to amalgam-filling, we have to suppose that a weight of mercury of twice the weight of the body is evaporating in the mouth or around the body. In order to have such experiments worth anything, the experimenter must possess a slight idea of figure-proportions. To bring a roach in the atmosphere of twice its weight of mercury, and to compare the result with the effect of an amalgam weighing one seventy-thousandth of the human body reminds us of the boy who got struck by an engine and knocked over, and in afterwards essaying on the properties of Iron, wrote: it is used for needles, it knocks people down and is used for steel pens. About the effects of mercury in amalgams on plants, a great number of experiments have been made by Runge, with pretty nearly opposite results from those of Dr. Talbot. His experiments four and five are of the same inconclusive kind; in one case a guinea pig is put in a four-quart glass jar with *four ounces* of mercury!! When we investigate the effect of *amalgams* we ought not to surround the animal with twice its weight of *pure mercury*. For one cockroach we have to give about—say liberally !—$\frac{1}{2000}$ of a grain, but not 20,000 times as much!! Now to that vapor of mercury! First, Regnault has done vastly more than Dr. Talbot; he has measured the exact tension of mercury-vapor for every degree of temperature. At 0° C. it is .027 millimeters, etc. Regnault has further proved that at 60° Fahrenheit one liter (one quart) of air contains about one-half milligram,—one one-hundredth of a grain—of mercury-vapor *if saturated;* now as Dr. Talbot himself acknowledges that in three months the amalgams did not lose weighable amounts, there follows, that in three months a person would not inhale one quart of vapor of mercury, having a degree of rarefaction as the air has in about two hundred miles' height. If the doctor wishes to prove anything about amalgams with his roaches, the only thing corresponding would be either to put his

roaches into a large box, with plenty of food, air and exercise, and introduce into the box for every roach one two-thousandth of a grain of *amalgam;* better still to insert one two-thousandth of a grain of amalgam into the mandibles or tongues of those creatures, and if they die they prove something. Also here the experiments with the roaches lead to nothing but worthless conclusions. Dr. Talbot will hardly have fancy enough to deny the fact that millions of people wear "tons of amalgams," and live as happy with as healthy mouths as other millions who have gold cropping out at their teeth.

In the discussion which followed the paper, there showed itself an appalling amount of homœopathic superstition. Dr. Cushing alone did not follow the drift of the day, but put the thumb on the sore spot of the whole paper, that the blackening of slips, the killing of roaches, guinea pigs and dogs did not prove anything for or against amalgams.

Dr. Spalding made the statement of scraping mercury from the mucous membrane of the mouth, so that globules could be seen. In a paper we reprint in this number, Dr. Spalding shows too much common sense to be supposed to exaggerate about the above mercury-globules; yet if it proves anything, it proves that even immense quantities of mercury may be tolerated in the system without the effects attributed by Dr. Talbot to a single amalgam plug!

Dr. Taft—without doubt a very honest skeptic—never used amalgam, and he, of course, hails with joy everything supporting his dislike. But dislikes are nothing scientific. He dreads the vapor of mercury. But let us follow a little this vapor from the plugs. As the vapor has formed at the temperature of the mouth, it can only become condensed—as globules—at temperatures *lower* than that of the mouth. But the lungs have a higher temperature, hence no condensation takes place there; but nowhere else in the body does the vapor find any place for condensing; nay, even granting for a moment, that the vapor like that of oxygen may become absorbed by the blood, the surface of the whole body will evaporate the mercury absorbed and, as Dr. Talbot himself admits, in proportion to the surface. Now supposing an amalgam-filling of only (!) one square inch area; the area of the body being about 2,000 square inches, there will mercury evaporate into the surrounding air 2,000 times faster than it is taken up; hence to talk about cumulative effects under such conditions would be sheer nonsense. Besides, we must never forget that while man breathes about 27,000 cub. ft. of air in three

months, the quantity of mercury evaporating in that time could not be weighed by Dr. Talbot himself. Yet granting that one-half milligram evaporated, this was diluted with 9,477 million times its weight of air; it was furthermore—if possible—secreted 2,000 times faster than inhaled, and yet those roaches died from the vapor of twice their weight of pure mercury, and lots of people die every year from—railroad collisions. "Thy faith hath made thee whole." If these are the kind of experiments upon which homœopathy rests—and the drift of the discussion shows that they were accepted by the homœopaths in the meeting as proving something—we need not wonder that *scientific* (??) homœopathy has become such a monstrous absurdity; and as there will always be plenty of people unable to distinguish between "post hoc" and "proptee hoc," between an "after it" and "because of it," homœopathy will always have followers who find causal connections between "carbo" and a ceasing tooth-ache! We should like very much to get some more such conclusive experiments from Dr. Talbot; but let there be at least an approximate or distant connection between the experiments and the theory which is to be proved by them.

SELECTIONS AND ABSTRACTS.

SUGGESTIONS RELATIVE TO THE CAUSE OF RAPID DENTAL DECAY.

BY DR. C. W. SPALDING, OF ST. LOUIS.

During the last year I have given considerable attention to the examination of the mixed fluid of the mouth which is commonly denominated saliva. This examination has been devoted chiefly to the chemical properties of this fluid, with a view of determining how far this property of saliva is responsible for that rapid decay of the teeth which practitioners of dentistry so often encounter.

In common, I believe, with many other practitioners, I have supposed that an acid condition of saliva prevails, or at least may usually be looked for in most cases of rapid decay of the teeth. Under this impression I entered upon a series of chemical tests with a view of endeavoring to discover the cause of this assumed chemical condition of saliva.

My observations have resulted in the formation of an opinion amounting almost to conviction, that the agency heretofore ascribed to the chemical condition of saliva in promoting decay of the teeth in healthy persons, has been largely over-estimated, if it has not been altogether erroneous.

My first experiments were made upon the saliva of a young girl (aged 12) whose teeth were decaying rapidly, so much so that fillings previously inserted, that is, before the case came into my hands, whether of gold or of other materials, had lasted but a short time, and in whose teeth new cavities were constantly forming, and this at so rapid a rate that cavities of considerable size would form in the space of a few months, notwithstanding pretty thorough cleanliness and good general care. I looked to find an acid reaction of the saliva in this case, and had been reflecting on a course of medical treatment, having in view the correction of this supposed condition of the saliva. What, then, was my surprise, on finding after repeated tests, that the saliva of this young person exhibited in every test either a neutral or a slightly alkaline chemical reaction! In no one of a large number of tests was there any, even the smallest acid reaction shown. I immediately sought other cases where a similar destructive process was going on, but the result in each was precisely the same as in the case just narrated. Indeed, in none was an acid condition present where the subject was in passably good health.

A professional friend also made similar tests in some very marked cases of rapid decay with the same results—no acid condition of saliva revealed.

I do not wish to be misunderstood. I am not combatting the idea that an acid condition of the saliva would promote decay of the teeth. I have no doubt it would do so, but I am endeavoring to show this condition of the saliva is not usual in states of ordinarily good health while the teeth do often rapidly decay, although the general health is not perceptibly, or at least not seriously, disturbed. The view I now present is, if the general health is good or fair, and the saliva normal, or nearly so, any rapid decay of the teeth must be attributed to some other cause than acid saliva. In certain localities favoring the lodgment and retention of food, decomposition of food substances probably takes place accompanied perhaps by the generation of acid. But many of the cavities of the class now under consideration, are located at points very unfavorable to retention, and it would not be fair to assume that decay occurring at these points was

occasioned by products resulting from either the partial digestion, the oxidation, or any other change in food substances.

Are there any other known methods by which acids may be generated, to whose action this rapid decay of the teeth may be fairly attributed? Let the chemists answer. If yes, the methods should be sought out and explained that the chemical theory, as it relates to this class of cases, may be fairly presented. If, however, the chemical theory is found, on thorough investigation, to be inadequate to the production of this class of cavities, or of any cavities under the conditions I have presented, some other cause must be invoked. Are these undetermined causes external or internal to the teeth, or both internal and external? Under the suggestion that internal forces may become important predisposing causes to decay of the teeth, our thoughts turn at once to faulty development, and to the period when calcification of the teeth is going on. The calcification of the deciduous teeth commences about the fourth or fifth month of fetal life, and that of the permanent teeth during the ninth month of fetal life, or the first month after birth. It will therefore be seen that if medicinal treatment is to be attempted, it should be commenced at an early period of fetal growth. The calcific process continues uninterruptedly until the completion of the third molars, which it is probably safe to say does not take place earlier than the fifteenth year. Yet I think we may with fairness conclude that if the deciduous teeth are perfectly developed, no medication will be required to insure a similar condition of the permanent set.

If defective development is to be regarded as a primary predisposing cause of the early and speedy decay of the teeth, our attention should, first of all, be directed to the most effective means of correcting this evil. Evidently there is but one mode by which preventive or corrective methods can be made effectual previous to birth. It is only through the blood of the mother that ante-natal treatment can be successfully applied. But whether defective development is due to a scanty supply of nutrient material, or to a lack of assimilative or developmental force in the individual, is first to be considered, that treatment may conform to diagnosis. If to insufficient supply, would not the defect be manifest in the general osseous system? The amount of mineral salts requisite for the calcification of the teeth—or I might limit the comparison to the enamel of the teeth—is small, compared with that which is necessary to construct the entire skeleton. I may here notice the fact that bone and dentine are but imperfectly calcified

at birth, and that deposition of lime salts goes on at a rather rapid rate for a considerable time after birth; and it should also be noted that the post-partum deposition of lime salts is probably slower and more difficult in enamel than it is in either bone or dentine. This latter implies the greater need for ante-natal methods of insuring the perfect formation of enamel. But to return. The relatively small amount of lime salts composing the hard elements of an entire denture would scarcely be missed if the deficiency was equally distributed over the whole osseus system. If defective enamel is owing to an insufficiency of supply, would not the defect be general and show itself elsewhere as well as in the enamel of the teeth? I am aware that the tardy closing of the fontanelles, and the late hardening of the bones of the infant, are indications of a lack of ossific material; but these cases are exceptional, and include but a small proportion of those in which rapid decay of the teeth is a marked and prominent symptom. If this condition does not proceed from a deficiency of nutritive material, it must necessarily arise from a want of assimilative force. I am inclined to accept the latter hypothesis, and to attribute the faulty formation to what I may call defective lime function, rather than to a lack of the substance itself. If this view is correct, we are at once brought into the field of preventive medicine, a field that has been but imperfectly tilled, especially that branch which relates to medical treatment of the unborn child.

Probably Jenner was the first to bring into notice an useful example of preventive medicine when he announced the discovery that cow-pox inoculation was a preventive of small-pox. This was also one of the first revelations of the prophylactic utility of the law of similars. Grawvogl has more recently applied this law to the correction of hereditary ante-natal deformities, by the use of prophylactics administered to the mother. He reports a case of what may be called hereditary *hydrocephalus acutus*, although neither of the parents exhibited any tendency towards this disease. Two children had been born in this family and both had been attacked in early life, both cases terminating fatally. The parents are described as being healthy, both having blonde hair, thin skin and blue eyes, one being spare and the other of full habit. The disease began to be developed in both children coincidently with the eruption of the lower incisor teeth.

Osseus nutrition is always deficient in *hydrocephalus*, resulting probably from defective assimilation. This imperfection would probably manifest itself in the formation of the teeth as well as in the cranial

bones, and, if so, the cause must have been in operation previous to their eruption. This latter event is usually accompanied by considerable disturbance of the nutritive processes, and this disturbance may well be supposed to occasion manifestation of any predisposing causes of disease that had heretofore lain dormant. Hence, the concurrence of *hydrocephalus* and dentition.

In the treatment of the above-named case sulphur and calcarea phos. were given, one dose of either on alternate days to the mother, commencing at the beginning of gestation and continuing to the birth of the child. Two additional children have been born of the same parents, both under this treatment of the mother, and both now respectively five and three years of age, are reported as being fine, healthy children, entirely free from any hydrocephalic symptoms. This case was not reported for the reason that it was either a solitary or an unusual one, but for the purpose of illustration only. Similar treatment has been pursued in other families where there had previously been a hydrocephalic child, and the same good results have uniformly followed. Hydrocephalic children have also been successfully treated by similar means, with the difference that sulphur was not indicated after the disease had made its appearance, and was, therefore, omitted.

Another interesting case of preventive medicine has been recently reported by J. C. Burnett, M. D., of London, England. In 1874 Dr. B. was consulted by a gentleman about his children, the youngest of whom had double hare-lip. The one next older had a defect in the upper lip, amounting almost to hare-lip, while the third or oldest child had no similar defect. The first born being perfect, the second having an insufficiency of the upper lip, and the third having double hare-lip, it was thought, taking all the circumstances into consideration, that the fourth child would be likely to have double hare-lip and possibly cleft-palate. It was determined to endeavor to prevent so unfortunate an occurrence, and an attempt at ante-natal treatment was made with that view. Calcarea sulph. was chosen in this case in preference to calcarea phos. by reason of the psoric diathesis of the mother. At full term the mother gave birth to a perfect child, and subsequently the same treatment was followed through a second pregnancy with a like result.

The Practitioner for December, 1878, contains a paper "On the Preventive Treatment of Cleft-palate, Hare-lip, etc.," by Thomas P. Tuckey, M. D., of County Cork, Ireland. He reports the following case :

Mrs. H., aged thirty-five, mother of six children. Every one of the children has had hare-lip, two having also had cleft-palate. The mother could not call to mind any case of hare-lip in her own or husband's family. Both parents were strong, healthy persons, neither having ever been seriously ill. Dr. Tuckey proposed ante-natal treatment.

A pregnancy occurred, when the doctor prescribed the following mixture :

℞. Calcis phos. . . . ℥ j. grs. 20.
Calcis Carb. . . . ℥ j.
Bicarb. magnes.
Chlorid sodii.
Sodæ Phosph. aa–|–ss. M.

The above to be added to an 8 oz. mixture of gelatine, gum arabic, syrup of ginger and cinnamon water ; 1 dram, three times daily.

As clefts in the palate and lip are said to be due to arrest of development prior to the end of the third month, Mrs. H. was put upon this mixture at once. It was no doubt intended to represent the constituents of bone. The essential parts are the lime, magnesia and phosphorus.

"The woman took her medicine regularly until the fourth month ; at her full time she was delivered of a girl without a trace of deformity about her lips or palate."

Dr. T. reports another case, Mrs. L., "mother of eight children, most of whom had cleft-palate and hare-lip ; in four of them the hare-lip was double, and more shocking objects of deformity he had never seen. One boy was perfectly repulsive. The woman believed herself pregnant, and was at once put on the medicine. She went her full time, bore a girl without hare-lip, indeed, but who evidently had had one in utero ; for the lip, though united, was united crookedly, and one side was puckered up, as if by a slight and narrow burn."

It may be objected that these cases prove nothing ; that there is no positive evidence that the same children would not have been born without deformity if no medicine had been given. To this I answer, I am only citing history, leaving every one free to draw his own inferences. Besides, I am only making suggestions for the purpose of drawing attention to the subject with a view to further investigation, in which I trust the members of this Society will join.

Embryology teaches us that the face is formed of a central portion

produced from the frontal process, and of right and left lateral parts derived from the extremity of the first visceral arch. From this arch proceed the parts from which the superior and inferior maxillaries are subsequently developed. At the period in developmental growth when the superior maxillary unites with the frontal process, a cavity remains which constitutes the nasal cavity. The palate and intermaxillary bones bridge this space, and thus the nose is separated from the mouth. There are many varieties of congenital cleft of the palate, differing, however, only in degree, while all of them may be said to result from arrested development. Whenever the inter-maxillary fails to unite with the maxillary bone, a cleft is the result. The same causes which produce the cleft, produce the corresponding hiatus in the soft palate or lip.

In conclusion, I wish to say that it does not appear to me to be a legitimate inference that this arrest of development is due to a lack of nutritive material. The maxillaries and all other parts of the osseous structure complete themselves in the usual way. The arrest of development is limited to a specific and comparatively insignificant anatomical part. If the arrest was due to a lack of material, would it not be likely to include a larger area, and at least affect other parts that calcify coincidently with those now under consideration?

I feel, Mr. President, that an apology is due for the hasty and imperfect manner in which these notes have been prepared. My excuse is that the paper is not intended as a treatise, not even as an essay, but only as a brief presentation of some of my thoughts relative to this obscure, yet very important, subject.—*From the Transactions of the Illinois State Dental Society.*

Dr. Louis Elsberg has resigned his professorship in the Medical Department of the University of the city of New York, and has been elected professor of Laryngology and diseases of the throat, in Dartmouth Medical College.

A new society has been organized in New York city, called the Materia Medica Society. It has but two officers, who are chosen by lot, and not by ballot. Every person desiring to become a member must write an acceptable thesis. Its members now number thirteen, including some of the most eminent medical gentlemen in New York city.

EDITORIAL.

We extend our thanks to the sender of the *Pacific Dental Directory*, compiled by W. O. Thrailkill, editor of the "*Dental Jairus*."

An error crept into our last number. We spoke of the *Dental Register* as becoming a monthly instead of a bi-monthly; the *Register* was already a monthly long ago; our remark was intended for the *Ohio State Journal.*

We do not believe that *one* reading of our selected article this month will satisfy the advanced, thinking dentist. We copy it from the Transactions of the Illinois State Society, and have not seen it in print elsewhere. It is eminently worthy of a wide circulation, and of just that kind and tone that the *Journal* best likes to assist in bringing before the profession. We believe the doctor has "struck a lead" that "will pay to work." There is golden ore of *truth* ahead in that direction.

An article of Dr. Viney, which appears in this number, will show our readers and would-be contributors, that we do not savagely assail every dissenting view; we give every one of our contributors full liberty, without, of course, restricting ourselves as to the extent to which we express our opinions about his views. Thus the views of Dr. Viney about "vitalized," "vital" "vitality" seem to us those of the old schools, before physiology had become what it is, yet we wish to give also to those of our readers who have been brought up in these hypotheses and speculations some congenial food.

An announcement of the Dental Department of the University of California has been sent to us. If the display of good-sounding names means anything, the University intends to rank among the very best in the country. The dean of the dental department is Dr. S. W. Dennis, M. D., D. D. S.; the faculty has special professors in Operative Dentistry, Dental Pathology and Therapeutics, Dental Art and Mechanism, Physiology, Chemistry, Anatomy, Surgery. They mean to do some good work; from 8 A. M. to 6 P. M. they keep their students busy with lectures and clinics.

Some of our readers inquired about the words we employed for the different forms of nitrogeneous substances ocurring in the body. We call—with Elsberg—*bioplasson* the net-like structured live protoplasma-tissue as occurring in live beings. Dr. Beale gave to a similar substance the term *bioplasm*, but his bioplasm is of a more vague nature than the modern bioplasson. *Protoplasm* is the substance of the bioplasson from chemical standpoint, paying no attention to its structure. It might be correct to say: protoplasm, if assuming structure, may be termed bioplasson, but vice versa, we could not speak properly of bioplasson having affinity for oxygen; in this affinity for oxygen not the structure, which is essential to bioplasson, is of a determining nature, but its chemical constitution as protoplasm.

In this number we publish a reply of Dr. Williams, of North Vassalboro, Me., to our criticism of his article. Our readers will see that we are liberal and tolerant in "andiatur et altera pars." We would not promise to print every time as long a reply as that of Dr. Williams; but being personally not at all interested, only "scientifically," we wish ample discussion of the doubtful points. Those criticised may take it as granted that *we read their articles as carefully as possible*, and that probably the most careful perusal an article experiences is in our study; perhaps sometimes we read them more carefully and critically than they were intended to be read by their authors. But please, gentlemen, in replying, *do talk to the point*, otherwise we will never agree; nay, we might even feel compelled to have to cut a reply!

RAMBLINGS AMONG THE MONTHLIES.

A copy of the *Transaction of the Illinois State Dental Society* for 1881 has been forwarded to us, and though it is not exactly a Monthly, we did ramble through it. We first express our thanks to the sender, Dr. E. Noyes. By the index of the transactions we see that out there Dr. Black of Jacksonville, is one of the most active workers in the line of society work; Drs. Brophy (Chicago) and Spalding (St. Louis) also appear prominently. The leading original articles are: Dead Pulps and Alveolar Abscess, by H. H. Townsend of Pontiac; Dental Hygiene, by Dr. W. P. Richards of Elgin; Fractures of the Inferior Maxilla, by Dr. Thos. L. Gilmer of Quincy, illustrated by Dr. C. V. Black of Jacksonville; Development of the Enamel, by Dr. M. S. Dean of Chicago; The Chemistry and Physiological Action of Mer-

cury as used in Amalgam Fillings, by E. S. Talbot, M. D., D. D. S., of Chicago; What must be the Preparation for the successful Practice of Dentistry in the Future? by Dr. C. A. Kitchen of Rockford; Operative Dentistry, by Geo. S. Miles of Jerseyville; Fillings, by Dr. J. M. Hurtt of Peoria; Suggestions relative to the Cause of Rapid Dental Decay, by Dr. C. W. Spalding of St. Louis;—the last paper we copy in this number. Many of the papers and discussions reported are well worth reading, but we cannot enter into their details. We have already criticised at least parts of the articles of Drs. Gilmer and M. S. Dean. The paper of Dr. Talbot receives due care in this number.

Missouri Dental Journal. As far as the reader may find interest in the first article on Dental Reform, containing four pages full of what might be said in one-half a page, it is worth reading. The article on the treatment of teeth with dead or dying pulps, by Dr. H. H. Townsend, merits its publication; the author has or tries to get clear views of what he is writing about. We might slightly disagree on the term "muscular exhaustion," when applied to capillaries where there are no muscles properly; yet we do not know of any better to state shortly the fact. Most praiseworthy must appear the doctor's thoroughness in trying to save teeth. He is on the right track, and any poor, "devitalized," dead tooth preserved, in the gums, is worth many on the best hard-rubber set. Another good point is his advocating constitutional treatment together with the local one.

The *Odontographic Journal* of January, 1882, contains an article by Dr. Palmer. We suppose every writer has his peculiar style; we do not doubt that we have a decidedly peculiar style, but we feel ourselves in congenial company when reading the essay of Dr. Palmer on Preservation of Teeth by Filling. His style is all periods; we do not get always a clear idea as to whether one sentence has to be considered as belonging to a syllogism or as independently introducing a new fact. This, it is true, renders analysis and clear understanding rather difficult, but it gives a kind of variegated salad of good thoughts, and every sentence can be taken for itself without paying attention to the preceding and following one. To enter upon all the abrupt, disconnected, having-nothing-to-do little phrases which are either hopelessly dogmatical or just as hopelessly wrong, would uselessly occupy the space. There is a vast amount of excellent practical knowledge stored up in the doctor; but, alas, it reads in print so tumbled through the door all in one lump that we doubt if any man can follow the line of reasoning which runs somewhat the direction of the Labyrinth on Crete. We

are not bold enough to pronounce ourselves without fair trial about the results of the proposed gold-tin-combination. The views of Dr. Palmer, as far as he does not write about general things, but precisely to the point, are quite good and stated in accordance with chemical facts. The fact that gold and tin packed together form a kind of alloy is very new, and, if sufficiently confirmed, of great importance.

A number of "syllabi of studies in chemistry and materia medica," as used by the Philadelphia dental college, is given. Some terms are antiquated. The difference between combustibles and supporters of combustion is old and abandoned. When hydrogen combines with oxygen the combustion is mutual and both are combustibles; a stream of oxygen burns in an atmosphere of hydrogen, and vice versa. Rather meager is the amount of organic chemistry required.

Rev. Myron Adams, of the Rochester Academy of Science, publishes a paper on Amateur Investigation. It is true, if quantity of hypotheses and theories counts, the amateur leads, but the really scientific investigator hates that half-supported "guessing," "believing," etc., in which amateurs generally delight, and much of the notion that scientific theories are as fickle as creeds is due to the fact that outsiders so often are utterly unable to distinguish between the bottomless phantom of an amateur's fancy and the well reflected enunciation of a number of facts as a natural law by a competent specialist. Scientific men rarely answer these fictions and, of course, the amateur generally supposes that he has extinguished the scientific men. Very often amateurs give themselves great trouble to show the weak points of certain physical hypotheses like the ether-theory, as if physicists did not know them just as well or better; only by giving something better the amateur will find favor in the eyes of scientists. The greater the stock of positive knowledge of a man, the more valuable a theory pronounced by him, no matter if he be amateur or business scientist.

The February number of the *Cosmos* opens with an article of Dr. Wilbur F. Litch on Antiseptics in Dentistry. There is very little to be found fault with in his clear, precise statements. We should object to the phrase: that the "process of self-multiplication of bacteriæ is catalytic." This word "catalytic" is antiquated and nothing but an empty word without conveying an idea or giving a hint to an explanation. The passage about hydriodic acid in the pulp chamber deserves correction. Dr. Litch says: "The hydriodic acid, itself a

gas, etc., is instantly taken up by the water abundantly present, etc. Being in solution, the hydriodic gas under the conditions ordinarily present in the pulp chamber, may cease to be regarded as a factor in pressure." How could such a slip happen to Dr. Litch? Dr. Litch loses sight of the fact that this solution of hydriodic acid immediately will decompose the lime-salts of the tooth surrounding it, forming calcium-iodide; it will free the carbonic and phosphoric acids, the latter will in its turn decompose some more carbonates of lime, and thus Dr. Litch will readily see that the volume of carbonic acid gas generated will be equal to that of sulphuretted hydrogen decomposed. Nothing is gained, and the hydriodic acid by this decomposition becomes as powerful a factor in pressure as the gases of putrefaction were before its formation. Further on Dr. Litch says: that the hydriodic acid may be re-decomposed by oxygen present and yield iodine ready for new combinations with hydrogen. This is utterly impossible. First, no free hydriodic acid can exist in a capsule of lime-salts, as the pulp-chamber is; second, in a liquid where there is free oxygen there is no free hydrogen for the iodine liberated from hydriodic acid to combine with, hence there will be no such reaction possible as he describes. Dr. Litch calls the carbolic acid an adulteration of commercial creasote. We think there is no "creasote" possible without it. Considered chemically, creasote is always a mixture of much carbolic acid with cresol, phlorol, guyacol and creasol. Under our chemical column we will give some of the facts about this substance.

In an elaborate paper on: A Cause of lessened Prognathism, Dr. David Hunt bases much of his views on caricatures in Harper's Weekly by Nast of the "wild Irishman." How far such caricatures are of value in a scientific paper we do not know. The paper contains many words. A sentence like: "the greater part of the ganglion—Gasseri—is composed of *connective tissue cells*," needs a large amount of proofs. Of course, Darwin is once more annihilated, in one point at least, according to the opinion of the author of the paper.

The article No. XVIII., upon Regulation of the Teeth by the Positive System, by Dr. J. N. Farrar, must be a delightful reading to every practical dentist. The same holds good of the next article on Porcelain Crowns in Natural Roots, by Harry Weston.

The meeting of the New York Odontological Society, October 18, 1881, is reported. Dr. Louis Elsberg gave an address on electrical illumination and cautery in the mouth. He makes use of the oppor-

tunity to give his view of electricity. There is many a special physicist who may assent to Dr. Elsberg's view of electricity as a motion, yet the facts do not yet warrant him to pronounce himself decidedly. But his special view that vibrations between 40,000 times and 65,000,000,000,000 times a second constitute electricity will probably thus far have but few followers. We doubt if the term "production of electricity" is any improvement on Ohm's "electro-motive force." How a "production of electricity" can be multiplied or divided we cannot comprehend, unless it is "quantity" clad in another term. But by not agreeing in some points with Dr. Elsberg we do not wish to cause the impression as if the paper or the experiments were by any means poor; experiments and paper must have been highly interesting and instructive! Dr. Atkinson is right in saying that we ought not to depend on the old text-books; but who does that? We all get the latest, and a book on chemistry or natural philosophy made only ten years ago is already old in many respects. He thinks we can discard "quantity" and "intensity" of electricity by adopting the view of electricity as a mode of motion. By no means! Light, the most recognized mode of motion, has "quantity" and "intensity," and, besides, "pitch." Pitch is the length of the waves, intensity their height, and "quantity" the number of simultaneous waves reaching our eye in a given moment; and the same terms will have to be used of electricity, if it be a motion or something else.

CORRESPONDENCE.

REPLY TO PROF. MAYR.

The February number of the New England Journal of Dentistry contains a brief review and criticism, by the scientific editor, of my paper on the "Beginning of Physical Life," which appeared in the January number of the Cosmos. I believe this criticism is partly the result of a hasty reading of my article, but perhaps largely the result of a difference in apprehension of foundation principles. Different modes of thinking sometimes lead to such widely varying styles of expression that writers may attempt to convey the same ideas in language so unlike that there may at first appear to be no harmony between the two. But it seems to me that even a hasty examination of the first passage which Prof. Mayr has quoted, *if read with the*

context, must convince any intelligent reader that it *is not* "easily proved erroneous," and, also, that the ideas conveyed are identical with the illustration which he uses, apparently for the purpose of refuting my quotation from Beale. Prof. Mayr uses my quotation from Beale as follows: "The passage quoted from Beale—'Every particle of the bioplasm of living matter came from a pre-existing particle,' etc., seems to us wrong in this form." If this quotation had been carefully compared with the context, especially with the enumerated characteristics of bioplasm, the error into which Prof. Mayr has fallen would have been avoided.

The first of these characteristics, as quoted from Beale, is as follows: "The power of *altering* and *appropriating* certain soluble matters and communicating to these, properties or powers of the same nature as those which the already existing living matter itself possesses."

The fourth characteristic reads: "The power of infinite increase." That portion of my paper immediately following the passage which Prof. Mayr first quotes, reads as follows: "All matter intervening between the masses of bioplasson is formed material, *and is the result of pabulum, which, having passed through the condition of bioplasm, loses the properties of vital, germinal matter, and assumes a definite structure*." Now compare the above with the Prof.'s illustration of a growing tree. He says: "Experiments have proved, beyond doubt, that the ammonia, the carbonic acid, the water and the salts of the soil can be made to combine by previously present 'bioplasm' and to form entirely new 'bioplasm.'"

Most certainly this is true, and in perfect accordance with all that I have written. The ammonia, carbonic acid, water and salts are the pabulum or food material of a growing tree. The bioplasm possesses the power of *altering* and *appropriating* these matters and communicating to them its own characteristics. As the pabulum is converted into germinal matter, the outermost portions of the bioplasm lose the properties of living matter, are pushed farther and farther from the center, and become *formed material*, or structural matter.

It is *certainly* true that every particle of living matter came from a pre-existing particle, but it by no means follows that the material of which living matter is composed was not formerly in an elementary condition. Prof. Mayr then attempts to depreciate the importance of Beale's theory of living matter by citing certain chemical reactions which, he says, are analogous. *But an analogy is not an identity.* The word itself implies that a likeness may exist between things in

some circumstances or effects, while the things themselves are in other respects *totally different.* There is no known phenomena in chemical reactions which has any tendency to break the force of what Dr. Lionel Beale has written concerning living matter. The pages of this magazine might be filled in describing the differences which exist between any observed chemical changes and the phenomena exhibited by the simplest particle of living matter. All scientific investigation, instead of narrowing the gulf which separates living from non-living matter, is constantly widening it. And this must of necessity be so, for in the inmost nature of things they are separated by a *discreet* degree, and nowhere can you pass from one to the other by continuous degrees. The power of chemical change is molecular. The force which determines chemical action or reaction resides in each individual molecule, and the conditions necessary for the exhibition of these forces are, to some extent, under human control. But no chemist has ever "breathed the breath of life" into a single particle of matter. None ever will. There is no "narcotic philosophy" or mere sentiment in this. I deny and repel any statement which implies that I limit the scope of human progress and discovery. On the contrary, I attempted to indicate some of the truths which I believe will be of the greatest importance in all future scientific investigation. I stand always for the highest and broadest culture, and the utmost liberty of thought and speech. I do not wish to write anything except in a spirit of true kindness and courtesy, but I also believe that the time has come for those to speak who believe that life means something more than an exhibition of physico-chemical phenomena. Poultices and anodynes are good in their proper places, but there comes a time when we must use the caustic and the knife unflinchingly.

We have heard enough about *physical machines.* One is almost constrained to believe that the *thoughts* of men who talk about force being conditioned in the cell mechanism, just as it is in the machine, are in some way made to order by machinery. Let us throw this trash to the winds and stand face to face with the living truth. I reiterate the statement which I made in the January number of the Cosmos: *Any theory of the origin of any form of organic existence which fails to recognize the subjective condition of life must end in darkness and confusion.* I must be allowed to consider this position impregnable and irrefutable. I care not to know who is authority for any statement. I simply wish to know how much of truth there is in it. I will welcome

the discoveries which each day brings, but I must be my own interpreter of the facts. If Prof. Tyndall has taught us many things concerning heat, light, electricity, and sound, is that a reason why we should regard with approval his statement that he can discern in matter the "promise and potency of all terrestrial life?" Because Huxley and Haeckel have added volumes to our knowledge of natural history, shall we allow them to circumscribe our methods of investigation? These men who plead for liberal thought are too frequently the very ones who attempt to limit the scope of vision of any who desire to look beyond their field of labor. These thoughts were in my mind when I asked the question which Prof. Mayr has quoted: "But who has ever been able to trace and connect these changes in a germ?" I did not imply or intend to be understood as implying that these changes might not some day be rationally interpreted. But I am willing to place myself on record as saying that no "machine theory" can ever rationally interpret these things.

In the paper which was the subject of Prof. Mayr's criticism, I aimed to be suggestive rather than affirmative. I will now attempt to speak with no "uncertain sound," and to use language which cannot well be misunderstood. Life is not only the *cause* of form in organisms, but *is the form itself*. From the grey lichen which clings to the bleak rocks of the mountain side, up through every form of vegetable life, to the sacred ficus religiosa of two hundred centuries, beneath whose shade Gotama underwent his divine transfiguration; from the Bathybius Hackelii, 15,000 feet beneath the surface of the sea, up through every form of animal life to man, runs this law: *Life is the cause and form of organism*. The germ of an immaterial entity, call it by whatever name you please, is co-existent with every form of material organic life. Apply all of our present scientific knowledge to the growth of a blade of grass, and what does it explain? Only the outer, objective exhibition of phenomena. The discovery of every new fact only adds to the mystery from a materialistic point of view. I find no fault with the man who contents himself with studying effects. I admit the importance of knowing the exact chemical quantivalence of the albuminoid compounds, but I also claim for myself the unchallenged right to penetrate, if possible, beyond this plane of effects into the region of causes. The *Why* is of more importance to me than the *How*. I believe that the inner, immaterial relationships of life are of primary importance, and that if our scientific investigators kept this grand principle constantly in view we should soon have something

more to show as the result of our labors than a vast heap of lifeless, insignificant facts.

J. L. WILLIAMS.

North Vassalboro, Me., Feb. 20, 1882.

The S. S. White Dental Manufacturing Company send us the following printed circular:

DENTAL DEALERS' CONVENTION.

A convention of dealers and manufacturers of dental goods was held in the city of Pittsburgh, Pa., on the 8th and 9th of February, 1882, in pursuance of a call issued by a number of dealers for the purpose of securing harmony in the trade, and of dealing justly with customers by adopting a fair and equitable one-price system.

J. Littlefield, of the house of Codman & Shurtleff, Boston, was elected president, and Lee S. Smith, of Pittsburgh, secretary.

A permanent organization was resolved upon, and a committee was appointed to perfect the details thereof.

Resolutions were adopted looking to the regulation of prices and to business intercourse between the members of the association.

The utmost harmony and good feeling prevailed, and the convention adjourned to meet at the call of the Committee on Permanent Organization.

The following houses were represented:

Lee S. Smith; W. M. Herriott; Ransom & Randolph; Cogswell & Gee; Spencer & Crocker; George W. Fels; L. J. Frazee; Buffalo Dental Manufacturing Co.; H. J. Caulkins; J. R. Tantum & Co.; A. M. Leslie & Co.; The S. S. White Dental Manufacturiug Co.; H. D. Justi; Chicago Refining Co.; Gideon Sibley; C. B. Woodworth & Co.; J. L. Brewster, Jr.; Hood & Reynolds; J. B. Dunlevy; Lukens & Whittington; Codman & Shurtleff.

To prevent the loss of small screws in removing them to clean engine, hand-pieces and other delicate machinery, the steel screwdriver may be magnetized (either by rubbing upon *one* pole of a horse-shoe magnet, or by passing an electric current through an insulated wire wrapped about the tool), and when removing or returning the screw it will adhere to the driver, greatly facilitating the operation.

Dental Register.

Operating Table and Laboratory.

REPAIRING CELLULOID PLATES.

Repairs on celluloid require much more care than those on rubber. The beautiful cases made by the New Mode process with stippled gums are many times almost ruined by repairs conducted in a careless manner. The *pure tin* foil should be laid over the entire gums and well rubbed down with a towel or napkin so as to retain all the stippling as well as the case-hardened surface. Some plates may be almost covered in this way, but it must be done with *care*, if success is desired. Plates thus prepared before flasking will come out with these portions as perfect as before.

TIN FOIL FOR LINING CASTS.

Those who use the heavy tin foil for lining casts in the moulding of rubber or celluloid cases, have perhaps been much troubled by the foil not being easily removed, requiring much picking and scraping. This is because the foil is so largely adulterated with lead. If the foil is *pure tin*, and well burnished to the model, it can be torn from the case in an almost entire piece and will leave the rubber or celluloid in a bright and polished condition. It may be known from the adulterated article by its whiter appearance; also by its more fibrous condition in tearing. Ask for *pure tin foil*, and have no other.

CARE OF THE DENTAL ENGINE.

Since the dental engine was introduced to the profession there has been a constant call for a reasonably perfect hand piece. This has given rise to much study and experiment, and whatever result may be attained in the future, we have at present, at least, two which are worthy of praise. It must be remembered that any mechanism as fine as these should be well kept. Saliva and grit, which occasionally reach the bearings, will do more injury in a day than a month's ordinary use. Frequently separate and thoroughly cleanse the parts and use only a reasonable amount of oil. We call attention to this subject for the reason that we are sure it is deserved. We know the manufacturers will be grateful for this item, for they are often blamed for what is simply a result of our own negligence.

HOME MADE CORUNDUM POINTS.

I don't know that I can add any thing to the value of your paper, but will tell what disposition I make of my worn out engine burs. I used to consider them as dead stock, but of late have found them very useful. I take pieces of old wheel corundum, (not too coarse) and melt or soften them on a piece of sheet iron, then I put my bur in the hand piece, heat the point and revolve in the melted corundum until it softens as much as I want for the point, and while it is yet warm I revolve it on any smooth surface and true and shape them as I wish. I make some long and slim; some round; some cone shape, and some inverted cones. They can be made very quickly and with very little trouble. They are splendid for finishing fillings, and better than burs for opening cavities; when used under water or saliva, they cut almost as fast as the best bur. They leave the edges in better condition, do not heat the tooth and cause very little pain. I have used these points for some time almost to the exclusion of burs, except some of the smaller ones. I would almost as soon part with my engine as these home made points.—G. M. MERRITT, in *Items of Interest.*

Every dentist who has used stoned engine burs is aware of their superiority to the ordinary cavity burs. They cut faster, consequently with less friction, and they produce less pain in operating with them upon sensitive dentine. Those who comprehend the structure of dentine, readily understand why a clear sharp cut across its exposed sensitive surface is less painful than a grinding, tearing cut.

It is a comparatively easy matter for the dentist to stone his own burs, whether those previously stoned and worn or the ordinary cavity burs. It requires but a short time to bring each leaf of the bur to an edge with the use of a knife-blade-shaped Arkansas stone, examining the bur occasionally during the process under a pocket microscope or hand magnifier. It is essential to perfect work that the stone be kept at a keen edge, and this is easily done as follows: Take a strip of sheet lead three inches wide by fifteen or eighteen inches long and attach it *evenly* upon a straight and *perfectly level* piece of wood about two-and-a-half inches wide and a little longer than the lead. Allow the lead to extend over one end and the sides of the wood, bend the lead over and tack it to the wood over the sides and end—*not on the top.* Upon the top surface thus formed sprinkle some No. 1 emery, and without wetting or oiling the surface rub the stone lengthwise with the strip. Not more than three minutes' rubbing of the stone, after it has been used to sharpen a dozen burs, will be necessary to bring it to the required edge again.

Chemical Facts, Hints and Queries.

CARBOLIC ACID AND CREASOTE.

Though both substances are very similar in their reactions, there is a certain difference, owing to the fact that creasote is an impure commercial article of varying composition, while carbolic acid is a fixed chemical compound.

Carbolic acid is benzine or benzol (C_6H_6), in which one H is substituted by HO (hydroxyl), so that carbolic acid, according to the modern chemical views, is called Hydroxy-benzol $C_6H_5.OH$. Other names for it are: Phenol, phenyl-alcohol, and sometimes—though erroneously—even creasote; all these names mean the crystallized carbolic acid. Carbolic acid is made from coal-tar by a complicated treatment with alkalis and fractional distillation. Pure carbolic acid, or phenol, forms long colorless needles, melting at 43° C. (109° F.), and boiling at 184° C. (363° F.); it forms a combination with water—or a hydrate—containing over 90 per cent. of carbolic acid. Pure carbolic acid does not alter in the air. Besides its uses for surgical purposes, carbolic acid is very important for the fabrication of many dye-stuffs, like picric acid, etc.

Creasote is the crude article, prepared from the tar obtained by destructive distillation of beech-wood. It is a mixture of carbolic acid, cresol, creasol, phlorol and guyacol; the greater part of it is carbolic acid, though its amount varies exceedingly, depending greatly on the temperature at which the beech-wood was distilled. *Cresol* is the carbolic acid of the toluol, that is, of a benzol (C_6H_6) in which one H is substituted by CH_3, the radical of wood-alcohol; hence:

Benzol C_6H_6	Toluol $C_6H_5.CH_3$
Carbolic acid $C_6H_5.OH$	Cresol $C_6H_4.CH_3.OH$

The cresol, or methyl-carbolic acid, resembles very much carbolic acid in odor and reactions. It is somewhat less soluble in water; *creasol* is the characteristic substance in creasote, though it is there in very small quantities—sometimes not more than a few per cent.; it is a complicated compound, $C_6H_3.OH.CH_3.OCH_3$; has no very marked properties, and is much less "antiseptic" than carbolic acid or cresol; it has an aromatic odor, very different from carbolic acid. *Phlorol*, having the formula $C_6H_3.OH.CH_3.CH_3$, is a substance resembling very much carbolic acid; the amount of it in creasote is small. Guyacol,

$C_6H_4.OH.OCH_3$, is an agreeably smelling liquid, if pure; the "antiseptic" powers of guyacol and creasol are not as marked as those of phlorol, cresol and phenol, hence the power of the creasote depends chiefly on these three.

The term "antiseptic" is slightly vague, since it is not settled what "septic" is; if we term an "antiseptic" a substance having the power of preventing putrefaction, we have to consider that there exists hardly any substance, which if present in sufficient quantity, will not prevent putrefaction; the term putrefaction needs exact defining, too. Common salt is an antiseptic; sugar is an antiseptic, if employed in sufficient quantity, hence, to separate substances into antiseptics and non-antiseptic is impossible, and only attempted by those who think order in nature cannot exist, if they do not make boxes of ideas labelled by a foggy name, into which they distribute all substances. Too often we are apt to think that names which are given for practical convenience's sake, are scientifically exact or tenable.

M.

Dr. E. S. Niles, of Boston, Mass., had the kindness to draw our attention to experiments of Magitot that the tooth substance is not decalcified by ammonium chloride. He is perfectly right, and we would be wrong—if we had asserted anything like ammonia-salts dissolving the tooth substance. Our article on albuminoids shows that we do not look for the dissolving power to one of the common acids or alkalis, but to an albuminoid which reduces the organized tooth-substance to its embryonal condition—a solution of lime-salts in albumen. Dr. Niles says he has found all dental cavities, where caries is in active progress, of a distinct acid reaction. A carious cavity is a whole laboratory; outside, the decayed tissue may be strongly acid, inside perhaps alkali, and close to the tooth substance necessarily neutral. Just as in one part of a chemical apparatus—say of making an ether—there may be an acid in the flask, a caustic potash tube connected with it, a chloride of calcium tube connected, etc., and all kinds of reactions obtainable in accordance to where we test; thus, one spot of the decaying mass may be acid, another alkali; but close to the teeth there can be nothing but neutral. No free acid is imaginable for a moment in contact with carbonate of lime. We, of course, speak of the exact boundary line between the decayed mass and the healthy tooth-substance. Even carbonic acid would immediately combine with carbonate of lime to form bicarbonate of lime. If, therefore, Dr. Niles observed acidity—and we do not doubt for a moment, knowing personally his chemical abilities, that he observed right—we think it due to the action of the oxygen of the air upon the protoplasm on the freshly cleaned cavity; if acidity is present at the boundary-line, it cannot have existed there for any length of time!

M.

PROSPECTUS.

First.—We believe that there is a promising field of usefulness in New England for a wide-awake, wisely-conducted Dental Journal. We believe, also, that the facilities, and a sufficient amount of concentrated energy and determination are at our disposal to warrant us in undertaking the responsibility of meeting this demand.

Second.—We recognize the fact that, to a greater extent than ever before, the dental profession "is imbued with the spirit of *original investigation;*" that never before has there been so earnest a demand for *absolute facts and scientific exactness*, in place of careless statement, fanciful theorizing and undue reverence for venerable authorities. In view of which, we have secured the services of an eminent and broadly educated scientist, not only to preside over this department of the Journal, but to work with us in a systematic review and sifting of the accepted basal principles of dental science and a diligent and organized search for such new truths as the rapidly advancing and broadening fields of the sciences in general may have in store for our specialty. Results from this source will be promptly communicated through this Journal.

Third.—The "Associated Dentists," who comprise the general editorship, are all actively engaged in the practice of dentistry, and are entirely independent of all alliances and ambitions other than the best interests of the profession in its highest sense.

Fourth.—It is hoped that the dental profession will make free use of these columns as a ready means of intercommunication. Consider it, gentlemen, as your own, and take an active interest in it. We especially call the attention of Secretaries of Societies to this point, and hope they will act upon it.

Fifth.—While we are domiciled in New England, and assume our name as a convenient one to distinguish this from other Journals, we nevertheless aspire to the plain of making our influence felt for good, in common with so many other New England institutions, throughout the entire land.

Sixth—We earnestly solicit the aid of the profession in subscriptions, and original contributions, incidents of practice, etc., promising, on our part, to exert ourselves to the best of our joint ability to realize your ideal of a dental journal.

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ORIGINAL COMMUNICATIONS.

ORIGIN, DEFINITION AND DIVISION OF TISSUES.

BY C. HEITZMANN OF NEW YORK.*

The formation of tissues is a question much discussed by biologists and embryologists. New, and it is expected plain views can be obtained concerning this difficult matter, by reducing the germ of the higher animals into the schema of a single lump of bioplasson, f. i., an amœba. Such an attempt of simplifying the ideas of the significance of the "germinal layers" is made in this article.

ORIGIN.

All complex organisms—the higher developed animals—originate from an ovum of the female impregnated by the admixture of spermatozoids of the male. The ovum being enclosed by a hyaline layer (zona pellucida of Von Baer), is composed of living matter, in reticular arrangement (the germ of Remak), which contains a nucleus-like body, the vesicula germinativa with a varying number of coarser

*The author is about to publish his biological researches made in the last ten years in the shape of a book, entitled, "Microscopical Morphology," and communicates a portion of his work as a specimen of the whole.

granules, the nucleoli, the maculæ germinativæ. In mammals and some amphibia, the germ *in toto* is transformed into the animal, whereas in the eggs of birds, scaly amphibia and osseous fishes, a portion of the germ is changed into yolk which serves as a pabulum. After the spermatozoids have entered the germ and after fructification has taken place, its living matter increases rapidly, the vesicula germinativa disappears, and the germ, by a process of division, splits at first into two portions, separated from each other by a light, narrow rim, but connected by extremely delicate filaments which traverse the light rim. Each half of the germ splits into a number of lumps which, in the same manner as the first half, remain connected; thus the segmentation of the ovum results in the formation of numerous corpuscles, which by collecting in a flat layer represent the germinal disk of Pander in the germ of the impregnated egg of the chicken. The segmentation was first observed by Prevost and Dumas (1824), in the ovum of frog; by Coste (1848), in the ovum of fowl, and by Bischoff (1842), in the ovum of mammals. According to the last-named observer the subdivision into smaller elements in the rabbit's germ does not go on uniformly throughout its whole extent, inasmuch as in the germ a cavity is formed around which the elements of segmentation accumulate, in order to build up the germ-membrane proper with a slightly thickened spot, the germ-hill of Von Baer.

The first differentiation of the germ-disk, or the germ-membrane, consists in the formation of layers, of which at first two, shortly afterward three, are recognizable. The formation of such layers became known first through the researches of Caspar Friedrich Wolff (1768), who claimed that the whole system of the intestines is developed from simple laminæ. Pander, in 1817, perfected the theory of Wolff; he knew that after hatching had continued for twenty-four hours, three easily separable layers could be found in the germ-membrane. Von Baer, in 1822, described four layers, of which the two upper he termed the animal, the two lower the vegetative. Remak, in 1855, maintained that the germ-membrane of the impregnated but unhatched egg consists of two layers, and that, upon hatching, the lower is again split into two layers, the lower of which lines the one above it like an epithelial cover. Having ascertained the individuality of each of these three layers, he endeavored to find out their relation to the developing organs; he called the upper layer the horny or sensorial; the middle layer the motorial and germinative; the under layer intestinal and glandular. According to S. Stricker's researches (1860–1870),

the original under layer of Remak consists—at least above the germ-cavity, and before the middle layer has made its appearance—of only a single stratum of flattened cells, and the formation of the middle layer is due to the immigration between the two layers of new cells. He termed the upper layer of Remak the combined horny and nervous layer, as he found that in batrachia the horny layer is quite distinct from the nervous layer, the former being uniformly thin, the latter, on the contrary, thickened even in the earliest stages in that part where later the brain is formed. He is unable to confirm, despite of Remak's positive assertions, that nervous elements are also developed from the middle layer.

Stricker (Manual of Histology, Amer. edition, 1872), in speaking of the development of the fowl's germ, says: "The cells of the under layer change their form and arrangement during the first hours of incubation. They become flattened, and, when seen in transverse section, appear spindle-shaped. Hence, after incubation has gone on for a few hours, we can ascertain beyond even the shadow of a doubt that there are two, and only two, layers. * * * The under layer, immediately after its separation from the subdivided germ, consisted in some places of a single thickness of cells, while in other places, in a transverse section, small heaps of cells could be recognized projecting from the layer. * * * Peremeschko, however, has made the communication that the large granular cells, lying on the bottom of the germ-cavity, increase very considerably in numbers during the first hours of incubation. Now, since with this increase in numbers there is not at the same time a corresponding diminution in size, it is very natural to suppose that the cells which project from the under germ-layer fall to the bottom of the cavity. This suggestion appears all the more probable when we recall the fact that some of the elements of segmentation, which are situated in the lower portion of the germ, remain lying at the bottom of the cavity at the time when the germ, in the production of this very cavity, separates itself from the adjacent parts. * * * We are led to conjecture that the granular bodies, which before lay at the bottom of the cavity, have found their way to the space between the two first germ-layers." Stricker, based upon Oellacher's researches, says that similar relations are also found in the trout's germ.

At present investigators agree that the body of vertebrates is at first a flat sheet consisting of three main layers, for the designation of which the following names have been proposed: *epiblast*, the upper

layer; *mesoblast* the middle layer, and *hypbolast* the under layer. Of these the epiblast and hypoblast are very thin, composed of but one layer of plastids, whereas the mesoblast is a bulky heap of plastids, all of which are interconnected and represent the main mass of the future organism. As the originally flat sheet of the germ becomes curved downward so that the two lateral halves are bent toward the median line, where they grow together, cavities are formed in the interior of the germ, which are lined by the under layer and its derivatives. The horny layer furnishes the external covering of the body and the lining of the external glands, while the under layer provides the lining of the intestinal cavity and its glandular organs. Linings of this description are called "epithelia," and it follows that the epiblast and the hypoblast give rise to all epithelia, viz.: the epiblast to those of the skin and its epithelial formations (iucluding the crystalline lens); the hypoblast to those of the intestines and their glandular elongations and accumulations. The main bulk of the body is a product of the mesoblast; from it proceed the tissues termed connective tissue, which exclusively contains blood and lymph vessels, muscles and nerves, the latter arising from the uppermost portions of the mesoblast.

DEFINITION.

In comparing the earliest formations of the germ with a single plastid, formerly called a "unicellular organism," or a "protoplasmic body," such as the amœba, valuable hints may be obtained as to the significance of the three germinal layers. The amœba is covered by an extremely thin layer of living matter. If the amœba be flattened out and bent, its cover will represent the upper and under thin layer of the germ, which exclusively serves as an investing layer of both the outer surface and all cavities of the body, being directly or indirectly connected with the outer world. The main bulk of the amœba is living matter in reticular arrangement with thickened points of intersection of the threads of the network; this matter, retaining in the mesoblast and its derivations its reticular shape, furnishes in higher organisms, as a result of a sort of division of labor, the tissues. The nature of the tissues is determined: firstly, by the manner in which the living matter is distributed, and secondly, by the chemical changes of the fluid contained in the meshes of the reticulum. Tissues are complex formations of living matter in a network arrangement. The meshes of the network contain a liquid which allows the living matter

to exhibit contractility in a high degree, as in muscles and nerves, or the network contains a more or less solidified basis substance, which limits its contractility as in the connective tissue. The latter, on account of the presence of this solidified basis substance, mainly serves as a support for the more active tissues (muscles and nerves), and as a carrier of liquids in closed spaces.

DIVISION.

According to this view, there are but four elementary tissues in the animal body. All these are interconnected and built up on one and the same plan.

1. *Connective tissue.* In this the reticulum of living matter contains in its meshes a more or less solid, nitrogenous (glue-yielding) basis substance; while points of intersection rich in living matter, suspended in a liquid, represent the connective tissue corpuscles. Of all tissues, only the connective tissue carries in closed vessels the liquids which serve for nutrition, such as blood and lymph. Aside from this, and acting as support for other tissues, its physiological activity is relatively small.

2. *Muscle tissue.* The reticulum of living matter at its points of intersection consists of more or less regularly distributed large prismatic, cylindrical or granular thickenings (sarcous elements), connected by thin filaments, while the meshes contain a liquid which admits of powerful contractions of the living matter in large territories. This tissue is the motor apparatus proper. It is accompanied by and attached to connective tissue, carrying the vessels.

3. *Nerve tissue.* Here the living matter is arranged in the shape of either a very delicate reticulum with very small points of intersection (ganglionic corpuscles, gray matter), or in delicate solid cords (axis cylinders), while the meshes contain a liquid which allows the living matter in limited territories to contract rapidly. This tissue serves as an apparatus of sense-impression, intellect, and sensory and motor conduction. It is largely accompanied by and mixed with connective tissue, carrying blood vessels.

4. *Epithelial tissue.* The reticulum of living matter is very delicate, and arranged in flat layers, which at certain regular intervals contain a horny cement-substance. The function of epithelial tissue is to cover the surface and the cavities of the body; it alone serves as apparatus of secretion, and for the formation of the essential parts of reproduction: spermatozoids and ovum.

EXTRACTS FROM MY NOTE BOOK.

BY GEO. L. PARMELE, M. D., D. M. D.

A gentleman, whom one would think should know better, told me a few years since that he ascribed the preservation of his teeth—they being perfectly sound—to the fact that he, following the advice of his father, bit a large black snake, when a boy. He evidently is sincere in his belief in it as a prophylactic.

***

Relating this superstition to a patient lately, he said that in one of his fishing excursions to an adjoining country town, a charcoal-burner, with whom he left his horse, related to him the capture by his son Bill of an unusually large snake, and, in ending his yarn, said, "But Bill bit." "What do you mean?" inquired the gentleman. "Why, I say Bill bit him," responded the charcoal-man, "and you can just bet he haint goin' to have no tooth-ache."

***

"Our grandsires had various notions. Here was a young man of the people—speaking of the preservation of the teeth—saying that his grandfather claimed to have saved his'n by biting the spine of a rattlesnake from head to tail."—*A Newspaper Clipping.*

***

Stanley, in his "Through the Dark Continent," Vol. I., page 170, speaking of the men of Chaga, says they are "distinguished by the absence of the upper and lower front teeth, and by their shaven heads, on which were left irregular combs or crescents of hair at the top of the head and over the forehead." He might have said of some Americans, that they are distinguished by the absence of the upper and lower *back* teeth.

***

Eucalyptol is an antiseptic of high order. Blood and pus have been preserved in it for five months. It has no irritating or caustic action, and thus possesses all the advantages of an antiseptic, with none of the unfavorable properties.

***

In speaking of eucalyptol, I ought to say that I use an extract of the *leaves*, prepared by Sander and Son, of Sandhurst, Australia, they being, I think, the sole and exclusive manufacturers. According to Prof. Mosler, care should be used not to confound it with *ol euc. c ligno* (wood oil). There is a custom among some retail druggists to substitute the fluid extract which has, of course, no relation to eucalyptol.

I have just learned some interesting things about the common Lady-Bug (coccinella septempunctata), called in England Lady-Bird and Lady-Cow, and in France Bête de la Vierge and Vache á Dieu, "which, being interpreted," mean respectively, Beast of the Virgin and Cow of God. The larva of this pretty little bug is a great benefactor to gardeners, for they devour ravenously the aphides or green-fly. There is a member of the aphides family, feeding exclusively on the hop-plant, which has been known to devastate a whole plantation in a season. Here Mrs. Lady-Bug steps in to advantage, lays her eggs on the hop-plants, and when the larva are able to forage for themselves, good-bye, Mr. Aphides. Now Madame Lady-Bug has an unpleasant odor, which is caused by an oily fluid which issues from her joints in the same manner as in the Oil Beetle. This oily fluid has a strong disagreeable scent, and is used in some parts of England as a remedy for the tooth-ache (so says the Rev. J. G. Wood, naturalist). The finger is first rubbed on the legs of the Lady-Bug and then on the refractory grinder.

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The Secretary of the American Academy of Dental Science, in his report, page 32 of the New England Journal of Dentistry, says: "Dr. Merriam of Salem made remarks on sand-paper disks, in place of a written essay." By the way, won't it be nice when reports of meetings tell *what* was said, instead of the simple mention that Dr. What's-his-name made a few remarks on what-do-you-call-it? Acting on this brief sand-paper notice, and being short of celluloid disks, I coated the back of a sheet of OO sand-paper with shell-lac varnish, punched out with a gun-wad punch some disks, and mounted them on mandrils. I was surprised to see how well they cut and stood the wear. I wish Dr. Merriam would give us his method of constructing them—in fact, all needful knowledge of the subject.

Dr. Merriam's paper referred to will appear in May number of this Journal.—Ed.

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Working eucalyptus into the root canal of a tooth, last November, the idea struck me: will eucalyptus dissolve gutta-percha? If so, what a nice thing for root-fillings. Experiment showed me it could be used for that purpose, and since then I have been making root fillings after this method with highly satisfactory results.

PHILOSOPHICAL DENTISTRY.

BY E. PARMLY BROWN, D. D. S., FLUSHING, N. Y.

This may seem a new kind of practice to many of the profession, but, nevertheless, a wise practice, if the following definition of it is interpreted to mean *that* dentistry which does not necessitate an early grave for the operator, an impecunious family left behind, whether the dentist's life be long or short, or a life (while laboring for the amelioration of his fellow man's suffering) without a fair share of man's rightful comforts, enjoyments and even luxuries—*that* dentistry at the same time which is doing the greatest good to the greatest number of patients.

Philosophical dentistry means not only conservative practice, but it means much more: calling attention to all the surroundings, habits, and hygienic precautions of the dentist, as well as his principles of practice. I will not say that he must not be a radical, for getting at the root of matters pertaining to his calling, is his duty every day; but I will assert that he must not be a fanatic, which may lead him to extremes, interfering with the even tenor of his way, that will not guide him on to victory. Fanaticism may take the form of miserlyness, which may prove the man anything but a philosopher, if the last ten years of the millionaire dentists' life is spent in nervous agony, imagining himself going to a pauper's grave. Nor does the other extreme, pictured likewise from real life in the great metropolis of the greatest of Republics, prove to illustrate philosophical dentistry; where the genius comes to the great town, loses his head by the praise given to the skill of his hands, and habits of prodigality and conviviality lead him on to ruin and death in the hospital by delirium.

He is not a philosopher who kills himself by overwork of brain and body before he has reached his prime, for the dark ages of dentistry have passed, and many are the workers helping along the good cause, not requiring any one to make a suicidal sacrifice; for, remember, all of ye who are working for more fame than strength will allow, that the dental profession at large, is a poor dependence to rely upon for the support of your families when you are gone, for well does the writer remember one of the most heart-rending, dramatic scenes of his life, over twenty years ago, when he took the sum of *eighty-five* dollars (the total remaining after expenses) the *gift* of the dental profession to the widow of the founder of the first Dental College in the world. She, almost penniless, hopefully waiting for the expected liberal bequest, tore her hair in bitter anguish as she read the note taken by the

bearer of the pittance from the millionaire dentist, treasurer of the "Harris Testimonial Fund." "Take this back," she cried. "And this is the gratitude of the dental profession for the life of Chapin A. Harris, laid down in its behalf." But on second consideration, her pressing wants so great, she retained the amount, and literally died in a garret in London, years afterwards—a proto-martyr there must be, perhaps, in each great stride of man.

He is not a philosopher, and success not his, who drives away a new patient by telling that he has received as high as five hundred dollars for treating and filling a single tooth;—nor he who cannot cater to the whims of many, the dislikes and tastes of all. Good judgment, discretion, policy, gentlemanly deportment and good habits, with care in dress and neat and tasteful home and office surroundings, must be added to natural fitness for the calling, and proper professional training both of head and hand in order to make a life success of our scientific art.

The painter genius may be a very brute, so far as personal habits and surroundings go; but, nevertheless, his canvas may sell for thousands. The lawyers, the poets and the statesmen may be victims of intemperance, and their poisoned breath not sickening to the enraptured crowds listening to their eloquence; or the literary world, entranced by the music of their verses. But the dentist, even more than the physician, is continually in the presence of his patient, and every surrounding should be guarded with a jealous care, that not the most sensitive being who calls for treatment, should be in the least offended, either by feeling, hearing, seeing, taste or smell.

If the morrow calls for labor long and well, let the strength be treasured—food, drink, sleep, pure air—all will tell in the battle for success.

Blessed was the day to the dentist, when he was lifted up out of his "slough of despond"—the mucous, the saliva, and slimy nastiness, that he was struggling to do good work in; blessed was the day when his greatest enemy was dammed out. Let us not forget that without our modern aids to lighten the mental and physical strain to the operator, the dentists' future was in every way an uncertain and gloomy one—as statistics told us that in one single year in the past, where the death-roll of dentists in the State of New York numbered twelve, that four of the twelve were suicides, and in only one of the four could financial distress be attributed as a partial cause; where another was independently rich, and a prominent man in the profession.

In regard to the good things of this world, it may be truly said that pious people and parsons are praying for them; that lawyers are pleading for them; that children are crying for them; that beggars are asking for them; that thieves are stealing them; that misers are hoarding them, and that slaves are toiling for them, but that true philosophers alone are enjoying them.

SELECTIONS AND ABSTRACTS.

NATURE OF DIPHTHERIA POISON.

Drs. H. C. Wood and Henry Formad, coöperating with the National Board of Health, have been studying the nature of the diphtheritic contagium. They began with inoculating rabbits, under the skin or in muscles, with diphtheritic membranes taken from the throats of patients in Philadelphia. Not diphtheria but tuberculosis followed as an indirect and not a direct result of the inoculation, the relations between the two diseases seeming to be only apparent. When the false membrane was inserted into the tracheas of the rabbits, severe trachitis was produced, with an abundant formation of false membrane, identical with that of diphtheria. It was shown by further experiment that the production of false membrane involves nothing specific, but that any trachitis of sufficient severity is accompanied by it. The product differs from that of true diphtheria only in its containing fewer micrococci. Diphtheritic poison was next obtained from Ludington, Michigan, where a severe epidemic was raging. Inoculations with this matter, whether made under the skin, in the muscles, or in the trachea, were all followed by similar results, namely, a quick affection, a rapid spread of the local symptoms, and death; and the blood, examined during life or after death, was found to contain micrococci precisely similar to those found in the Ludington cases; and in a few instances the plants were found in the internal organs and the bone marrow. The urine of patients suffering from malignant diphtheria is full of micrococci, and is even more deadly in its effects than the membrane. When cultivated, micrococci from Ludington grew rapidly up to the tenth generation, and those from Philadelphia ceased their growth in the fourth or fifth generation, while those taken from a furred tongue, which showed similar shapes, never got beyond the third transplantation. The conclusion was drawn that the micrococci found in ordinary sore-throat and those of diphtheria differ only in their reproductive activity. When rabbits were inoculated with cultivated micrococci, diphtheria was produced with the second generation, but never with any later product. Diphtheria may be self-generated whenever conditions arise within the body or act upon it from without competent to stimulate the inert micrococci in the mouth into active ones.—*The Pop. Science Monthly.*

THE PAST, PRESENT AND FUTURE OF MECHANICAL DENTISTRY.

BY DR. L. P. HASKELL, OF CHICAGO, ILL.

When your committee requested me to prepare a paper for this meeting, and the subject was called for, I said it might be "The Past, Present and Future of Mechanical Dentistry." So I will offer for your consideration, in a few words, some thoughts intended to awaken inquiry, and provoke discussion upon this subject.

While there has been, during the last thirty years, great advances made in Operative Dentistry, in its material, instruments and methods, it is true that during the same period there has been little or no progress made in Mechanical Dentistry, so that practically the past and present of this branch of dental science, during this epoch are synonymous terms.

The cause of this condition of things has been mainly owing to the introduction of vulcanized rubber, by means of which a horde of quacks have foisted themselves upon the community, and cheap John, "$8 set" shops have been made possible. To such an extent has a demand been created for these cheap sets, that it has discouraged the profession generally from recommending and urging upon their patients the use of a better, healthier and more artistic mode of inserting teeth, requiring more expensive materials, and greater mechanical skill and artistic taste, but, of course, producing a piece of work of greater intrinsic value.

A little more than thirty years ago the use of plaster-of-Paris for impressions began to come into general use. There has been nothing better for reliable impressions, in *all* cases, introduced since.

Thirty years ago a partner of mine, in Boston, Dr. D. H. Goodno, after much experimenting, for a suitable metal for dental dies, using zinc, tin, type metal, fusible metal, brass and iron, at last tried "Babbitt metal," then but little known, and it remains to-day the *only* metal that has all the requirements of a dental die, viz: non-shrinkage, hardness, toughness, smoothness, and melting at a low temperature, so that plates swaged upon these dies, fit the mouth as they do the plaster cast; seldom is a second die required. And yet, our dental colleges, with one exception, I think, and the great mass of the profession, still plod along in the use of zinc with all its annoyances.*

*For the information of those desiring to use Babbitt metal, the following suggestions are offered. Much of this metal that is for sale is unreliable. The better plan is to make it as follows:

Copper, 1 lb.; antimony, 2 lbs.; tin, 8 lbs.; melt in a crucible—in a forge or other intense heat—first the copper, next the antimony, then remove from the fire, and add the tin, and turn off at once into small ingots; remelt so as to thoroughly mix. After moulding and cast-

Thirty years ago, the profession were just abandoning the use of spiral springs for retaining plates in the mouth, and beginning to use atmospheric pressure for that purpose; the plate was swadged to fit the plaster cast, sometimes raising it slightly over the hard palate. To-day no better method exists.

Thirty years ago, metal plates were used exclusively, and to-day they are the only suitable material, in all respects, for artificial dentures.

Thirty years ago, "gum sections" were carved for each case, and mounted on gold plates, and were used very extensively throughout the Eastern States. But to-day the *moulded* sections have taken their place, and the result is a stereotyped, stiff and unnatural looking system of artificial teeth.

Thirty years ago, Dr. John Allen brought to the notice of the profession his "Continuous Gum Work," and it remains to-day unchallenged as the only perfect method of constructing artificial dentures, and I must confess I see little room for improvement.

Thirty years ago, it required at least a fair degree of mechanical skill to make and insert a set of artificial teeth. To-day the merest tyro can buy a set of "gum sections," a piece of rubber, take an impression, and make a so-called set of teeth. But it is sickening to witness the result, as one moves along the street, enters the public assembly, or the social circle. "Artificial teeth" written everywhere. This is the present.

What is to be the future? It is to be just what an enlightened, progressive profession shall choose to make it.

To make it what it ought to be, it will be necessary to create a public sentiment that shall demand something besides rubber or celluloid, as the best, or even a good, material for plates. Let your patients know that these vegetable bases are, to a greater or less extent, injurious to the mouth and often to the stomach; that thousands of mouths are ruined by their use, in consequence of the undue absorption of the alveolar processes, always induced, to a greater or less extent, by the non-heat-conducting qualities of these materials; and also the more serious effects often produced by the poisonous qualities of the coloring materials of red vulcanite.

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ing the Babbitt metal die, when it is cool, wash it over with whiting. For the *counter* die use lead with about $\frac{1}{8}$ tin added, stirring till it begins to thicken, and pour. With these precautions there is no danger of the dies uniting, or of ever making a failure. Sand moistened with sweet oil will remain in condition for use many months, and is far preferable to that moistened with water.

Then the dental colleges ought to impress these facts upon their students.

More time should be devoted in these institutions to instruction in the practical details of the laboratory, even at the sacrifice of some of the dry details of theories about matters of little or no importance to the student; more instruction in *metal* work, and less in vegetable bases; simplifying processes, and abandoning obsolete methods and ideas.

More attention should be paid to the artistic, or the esthetic, requirements of mechanical dentistry; then we should the oftener witness teeth selected and arranged as nature would have them, the contour of the mouth restored, and harmony of the features re-established.

It would be better for the interests of the profession if there could be a division of practice, so that it would be an object for dental students, so disposed and having a taste for the mechanical department, to prepare themselves for the exclusive practice of this branch of the science.

I would not entirely dispense with the vegetable bases, for the reason that many are unable to afford anything better, but would advise their use only for that reason. And, when used, advise the use of plain teeth, as by that means more artistic results can be obtained.

SODA, A REMEDY FOR BURNS AND SCALDS.

BY F. PEPPERCOME, L. R. C. P.

Accidental burns and scalds, even when not very severe, extensive or dangerous, commonly cause so much pain for an indefinite time, depending probably as to duration and severity a good deal on the age of the sufferer, and on the greater or less degree of sensitiveness of the individual's skin or constitution—not forgetting the feverish reaction, and the dangerous internal secondary inflammations that are apt to follow in certain cases—that any easily applied and quickly available remedy and relief, without perhaps the immediate necessity of calling in professional assistance, will be acknowledged as a boon by most persons; and especially so, when it is remembered that the sooner the agonizing burning pain in the part can be allayed the less chance there is of dangerous secondary effects, besides sloughing, etc., so severely trying to children and old persons.

The usual first applications to these painful injuries, whether so-

called *popular* remedies, or such as are usually recommended by members of the profession, are numerous enough, but cannot unfortunately hitherto be considered as generally successful in giving certain and speedy relief from pain, and, too often, intense suffering. One friend will recommend that the parts be covered with flour from the dredger; another will advise fine cotton-wool, or wadding; another, starch in powder, or soap, or treacle, or the so-called carron oil, etc.; but hardly one of such applications can be said to give more than very uncertain or temporary relief from pain, although, perhaps, by occupying the attention of the sufferer, they may in this way prove of some *mental* benefit during his suffering—being indeed employed really for want of anything better—although, in fact, some of these applications, such as flour, treacle, starch, etc., prove so disagreeable in their after-effects, being often difficult to remove and renew, as to add frequently to the poor patient's depression and suffering, owing to their adhering to the injured parts in dry cakes, very irritating to the raw surface.

It is now many years ago that the author of this paper, while engaged in some investigations as to the qualities and effects of the alkalies in inflammations of the skin, etc., was fortunate enough to discover that a saline lotion, or *saturated* solution of the bicarbonated soda, in either plain water or camphorated water, if applied speedily, or as soon as possible, to a burned or scalded part was most effectual in immediately relieving the acute burning pain; and when the burn was only superficial, or not severe, removing all pain in the course of a very short time; having also the very great advantage of cleanliness, and, if applied at once, of preventing the usual consequences—a painful blistering of the skin, separation of the epidermis, and perhaps more or less of suppuration.

For this purpose, all that is necessary is to cut a piece of lint, or old soft rag, or even thick blotting paper, of a size sufficient to cover the burned or scalded parts, and to keep it constantly well wetted with the sodaic lotion so as to prevent its drying. By this means it usually happens that all pain ceases in from a quarter to half an hour, or even in much less time.

When the main part of a limb, such as the hand and forearm, or the foot and leg, has been burned, it is best, when practicable, to plunge the part at once into a jug, or pail, or other convenient vessel filled with the soda lotion, and keep it there until the pain subsides; or the limb may be swathed or encircled with a surgeon's cotton

bandage previously soaked in the *saturated* solution, and kept constantly wetted with it, the relief being usually immediate, provided the solution be saturated and cold. What is now usually sold as bicarbonate of soda is what I have commonly used and recommended; although this is well known to vary much in quality according to how it is manufactured, but it will be found to answer the purpose, although probably Howard's is most to be depended on, the common carbonate being too caustic. It is believed that a large proportion of medical practitioners are still unaware of the remarkable qualities of this easily applied remedy, which recommends itself for obvious reasons.—*The Practitioner.*

CIRCULATION OF BLOOD IN THE BRAIN.

Signor Mosso, who has been engaged on the subject for six years, has published some new observations on the different conditions of the circulation of the blood in the brain. He has had the privilege of observing three patients who had holes in their skulls, permitting the examination of the encephalic movements and circulation. No part of the body exhibits a pulsation as varied in its form as the brain. The pulsation may be described as tricuspid; that is, it consists of a strong beat, preceded and followed by lesser beats. It gathers strength when the brain is at work, corresponding with the more rapid flow of blood to the organ. The increase in the volume of the brain does not depend upon any change in the respiratory rhythm; for if we take the pulse of the forearm simultaneously with that of the brain, we cannot perceive that the cerebral labor exercises any influence upon the forearm, although the pulsation in the brain may be considerably modified. The emotions have a similar effect upon the circulation of the brain to that of cerebral labor. Signor Mosso has also observed and registered graphically the variations of the cerebral pulse during sleep. Generally the pulse of the wrist and the brain vary oppositely. At the moment of waking, the pulse of the wrist diminishes, while that of the brain increases. The cerebral pulsations diminish as the sleep grows deeper, and at last become very weak. Outward excitations determine the same modifications during sleep as in the waking state, without waking the sleeper. A deep inspiration always produces a diminution in the volume of the brain, in consequence, probably, of the increased flow of the blood into the veins of the thoracic cavity; the increase of volume in the brain, when it takes place, is, on the contrary, due to a more abundant flow of arterial blood to the encephalon.—*Popular Science Monthly.*

A GLOSSARY OF MICROBES.

Mr. W. Hamlet gives the following classification of the microbes—microscopic organisms of formentation and disease: 1. Microbes which appear as points are called *monads**, *monera**, or *micrococci*. They are motionless, and may be regarded as the spores of other microbes. 2. Motionless linear microbes—the *Bacteridians* and the *bacilli*. 3. Cylindrical mobile microbes, having rounded ends or contracted in the middle so as to form an 8, are the *bacteria* proper. Among them is *Bacterium termo* of putrefaction, the commonest of all. 4. Flexuous mobile microbes. They look and act like eels, and differ but little from the equally active bacteria. They are the *vibrios*. 5. Spiral microbes, resembling a cork-screw, and mobile; spirilla spirochetæ. Their presence in human blood appears to be connected with intermittent fever. 6. Microbes with heads, very active, having globules larger and more refractive than the rest of the body at one or both ends. These globules are apparently spores ready to be detached from a bacterium—*Bacterium capitatum*. Besides these six principal states, the microbes form agglomerations, or colonies, that often notably change the aspect of the elementary cells, and which have received various names. Agglomerations in microscopic masses, surrounded by a jelly that sticks them together and deprives them of motion, are called *zoogloea*. A non-gelatinous membrane formed of motionless bacteria is a *mycoderma*. Bacteria attached end to end in a string form filaments of *leptothrix*. A number of spherical micrococci joined one after another form the string of round grains called a *torula*. A considerable number of species may be included in each of these divisions; and there does not appear at present any way to distinguish by sight a disease producing bacterium from a harmless one.—*Popular Science Monthly*.

A REMARKABLE OPERATION.

In the session of February 25, of the physico-medical society, at Würzburg (Germany), Dr. v. Bergmann, professor of surgery, showed a man of fifty-six years of age, whose whole larynx had been extir-

* *The terms monads and monera are wrongly applied to these specks of microbes. Monads is the name of the whole class of "shapeless" beings to which amœba and monera belong; monads is therefore a zoologically well defined group; while monera is the species name for the class of amœbæ without nucleus; the terms monads and monera have come into general use since Haeckel's writings, and they are properly applied only to distinct but lowly organized species of the Protists family. Moneræ and monads are relatively large—some 0.1 millimeter, while micrococci, which properly belong to this group mentioned in the paper, are less than 0.01 millimeter long.—Sc. Ed. of N. E. J.

pated in January, because of cancer. The man had perfectly recovered thus far, but the most remarkable performance was his speech. At the place of the normal larynx, there was put an artificial larynx, with a pharyngeal canal for swallowing, a tracheal canal for the respiration, and a "phonic," or voice-canal for speaking. When talking commonly, the man whispers, but he is able to speak plainly and loud, though with much expense of air. The vocal cords are of rubber, and, of course, not adjustable, hence the voice is completely monotonous, but as tongue, lips and palate remained perfect, he articulates plainly and is easily intelligible. He thanked in a loud speech to Dr. Bergmann for the successful operation. He pronounces about four words with one breath, after which he has to take a new inspiration. The "subject" is, of course, highly elated at the success. As far as statistics go, there is a fair chance of permanent cure—a man operated on in 1880, by Cerny of Vienna, in a similar manner, still lives perfectly free from any recurrence. The great mistake of those affected is, that they wait until serious symptoms come on, and all the vessels or the cartilage of a long tract of the trachea is infiltrated, and the general health is so far reduced that they are unable to stand the severe pneumoniæ and fevers that are apt to follow the operation. The artificial larnyx was made by the "Orthopaedist," Baüerle, of Tübingen (Germany).

A CURE FOR INSOMNIA.

In order to promote sleep when it is wanting, it is of course necessary in the first place to remove every exciting cause of wakefulness. The whole chance of success lies in compelling the mind by a strong effort of the will to give up the train of ideas by which it has been occupied, and to take up the less interesting and more simple ideas presented to it. Some years ago a curious plan of procuring sleep by this means was announced as a great discovery, by a Mr. Gardner; and testimonials as to its efficacy were given by the late Prince Albert, Sheridan Knowles, and other men of eminence. This plan, the secret of which was bought by Mr. Binus, and published in his "Anatomy of Sleep," was as follows:

The person, who after going to bed finds himself wakeful, is to lie on his right side, with his head comfortably placed on the pillow, having the neck straight, so that respiration may be unimpeded. Let him then close his lips slightly, and take a rather full inspiration, breathing through the nostrils, unless breathing through the mouth is

habitual. Having taken the full inspiration, the lungs are to be left to their own natural action. Attention must now be fixed upon the respiration. The person must imagine that he *sees* the breath passing from his nostrils in a continuous stream, and at the instant that he brings the mind to conceive this apart from all other ideas, consciousness leaves him and he falls asleep. Sometimes it happens that the method does not succeed. It should then be persevered in. Let the person take thirty or forty full inspirations, and proceed as before; but he must by no means attempt to count the respiratory acts, for, if he does, the mere counting will keep him awake. The plan is at all events safe, and can easily be tested.

The director of one of the largest public lunatic asylums in Germany lately said to an assemblage of physicians that much of the increase of insanity was due to the forcing process to which children are subjected in the public schools.

EDITORIAL.

On January 27, 1882, the first number of *The New England Journal of Dentistry and Allied Sciences* was committed to the care of the mail and sent out on its new and untried mission to the dental world. The proprietors and editors of the same entered upon this work with no little confidence that there was room and a field for such a journal as was contemplated; but, at the same time, knowing full well that all such enterprises require time and persistent work to accomplish success in, at least, a *financial* sense, they did not anticipate a reception that would place the Journal upon a self-sustaining basis before, at best, the close of the first volume. To have so prepared the way, that the *second* volume could start upon its course without being a tax upon the pockets of its proprietors, would have satisfied their expectations.

This being the case, we may perhaps be indulged in occupying a little space to express our appreciation of the fact that the reception accorded to the *Journal* has been such as to warrant us in making the statement that as this, the fourth number, goes to press, it has already become self-sustaining. We are, of course, much gratified, and consider it the highest compliment that could be given us. We

have thus accomplished in *two months* what we had anticipated *might* be accomplished in a year. It shows that, instead of *over*-rating, we *under*-rated the readiness of the profession for a *Journal* that takes high and advanced ground in scientific matters pertaining to its specialty.

It would be a gratification to us to put in print many letters that we have received from the most prominent men in our profession from various parts of the country, but as this is chiefly of interest to us, we forbear to occupy space better devoted to matters of more general interest. To all such, however, we wish to express our hearty thanks.

In our last number we used the terms "tooth-driller" and "tooth-plumber" with reference to those dentists who think that the ideal of a dentist consists in being able to pack within a given time a certain number of gold-leaves into a cavity. What has brought it about that dentists begin to be treated as special doctors on the same level with other specialists, like oculists? etc. Not all the gold ever packed into cavities would have raised dentistry to a branch of medicine. Dentists forever would have ranked with the barber and jeweler; what raised the standard of dentistry was the broader education demanded from a dentist, or, as the German expresses it well, "Zahnarzt"—tooth-physician. While we, therefore, respect the skilled, properly qualified, practical dentist, we have to consider that we cannot raise the standard recommending more gold, or a certain shape of plugger—no, the general education of the dentist must be raised. Probably every dentist is able to fill a cavity with gold, but to understand the tooth, the action of certain material, etc., that is what we are after, and where we disagree with those who consider gold-packing the chief duty of a dentist. If read in connection with the other words we used in the passage of our last number, every not grossly unfair reader will see that far from belittling the professional skill. we wished only to raise it above the mere mechanical routine, and to recommend at least an understanding of the chief principles underlying the teeth and their history.

Forty-one new dentists were graduated by the University of Pennsylvania, March 15, 1882—three of them being from New England, ten from foreign countries, and thirteen from Pennsylvania.

RAMBLINGS AMONG THE JOURNALS.

The *Dental Cosmos*, of March, 1882, is full of interesting reading matter. It opens with an article of Dr. H. Gerhard on Conservation of the Teeth. We consider him right in his view that the cause of failures is often more in the teeth than in the material, that the structure of the teeth of civilized people is less dense than of savages. His statement, "It is a notable fact that the teeth of Americans are more universally and more extensively the subjects of caries than those of other people," might be questioned. In our experience, at least, the Switzerlanders carry off the prize in bad teeth. That the process of mastication is essential for good teeth, seems very plausible, considering analogies with other tissues of the body.

Dr. E. S. Talbot's paper on Treatment and Filling of Approximal Cavities is the second article. We do not enter upon many of the good mechanical details of the article. The suggestions of Dr. E. S. Talbot seem to us very much more reasonable than those of many *artificial* contour advocates.

As usual, the meetings of the New York Odontological Society, November, 1881, are reported. Dr. James Taylor read a paper on Cylinder Fillings. He asks why the pain ceases after removal of the carious portion from a sensitive tooth. If we consider caries as an ulcer, this is very easily intelligible; the center is dead, and, of course, without sensation, but around it is inflamed and diseased dentine, which is sensitive just as the reddened skin around a fistula or an abscess; after this is cut away, healthy, little sensitive tissue is worked on and cut, and the pain is just as much less as from a cut in healthy tissue compared with one in the sensitive tissue around an abscess. What is the advantage of his "gold-cylinders" over a common amalgam filling, if, as he says, that they are chiefly adapted for central cavities? We suppose that almost any material will do for these, and amalgam certainly can be packed quicker still than these—necessarily very imperfect—cylinders, if speed is the chief thing to be gained at the expense of hardness and tightness. Quite a long discussion followed of the soft-gold-men against the cohesive-gold-men, in which it seemed to us that the cohesive-gold-men came off second best, at least as far as convenience for the "subject" and saving of time and risk of imperfectitudes were concerned. Dr. Rich led the cohesive-gold-men, and Dr. Perry the soft-gold-men.

The Treatment of the Dental Pulp occupied the Pennsylvania Association of Dental Surgery. Prof. Buckingham opened the discussion

with a good synopsis, but unfortunately more negative than positive conclusions. Dr. W. X. Trueman recommends—and as it seems with very good practical and theoretical reasons in its favor—destroying doubtful or diseased pulps, and filling the root canal with creasote and cotton. He prefers this to any other treatment; gutta-percha he found of no use in capping exposed pulps, the pulp being generally dead under it, and the gutta-percha disintegrated. Also he, like many other distinguished practitioners, uses arsenic with "fear and trembling." "Secondary dentine" was touched, but no one in the meeting seemed to have experience or an opinion decided enough about it to enter into it.

In an editorial on "Syphilis," reference is made to Dr. J. William White as authority about the frequency of the disease, etc. We suspect that some of the statements are highly overdrawn, or else that the term of "syphilis" is taken with an inexcusable latitude. The "dualists" in syphilis are decidedly the majority nowadays, if weighed, and all seems to point towards the conclusion that they are right; that it is a misuse of the word to use it for soft chancre, for gonorrhœa and similar local affections. Our own medical observation gives much lower figures. Real syphilis is relatively rare in the United States; probably not one person in one hundred is affected by it, while the milder forms, chiefly of gonorrhœa, are quite common. The cases of *doubtless* hereditary syphilis are even very rare; probably many doctors of two or three years practice never met with *decided* cases. The morality, chiefly of New England towns and small cities, is very much higher than in Europe, and the public vice either very much under control or at least so expensive that it is dangerous to less people than in Europe; furthermore, the average age of marriages here is lower than in Europe, where the military service in most countries deprives strong, healthy men of the possibility of marrying before they are twenty-five years old, but exposes them more to the allurements of the great cities, in which the soldiers are generally kept. If syphilis had such terrible effects as it is often claimed by people who get easier scared by a name than by facts, the French would have to be the most wretched creatures. In the eighteenth century, probably every family had one member sick of real syphilis; in Napoleon's time, probably every soldier once came in contact with the great infecting center, Paris; yet bodily and dentally the French of nowadays are probably superior to many tribes among whom syphilis is unknown. The average age of humanity —22 in the eleventh century—has risen steadily and without interrup-

tion, in spite of the outbreak of syphilis in the sixteenth century, and its unparalleled prevalence in the eighteenth. Every one of us had some syphilitic ancestor, and yet in every detail the average of the modern civilized American stands higher than the Papua or South America Indian. The best thing is to get control over a disease as much as possible, if we cannot eradicate it. Uniformly in the larger cities of Europe all prostitutes are kept under rigid control ; e. g. at Berlin, a prostitute is not molested as long as she attends the examinations of the special health-officers twice a week, who enters his remarks in a kind of pass-book which she has always to keep on her person ; the soldiers are examined once every week, and, if found sick, immediately treated, etc. ; thus the authorities have the the disease in the "free and easy" Berlin far more under control than in the Quaker-city, Philadelphia, where it is smouldering under a thin layer of hypocritical fear, and undermining in the dark, because a clear understanding of the facts is so utterly lacking.

In answer to those who think we were too harsh in saying that a dentist who does not understand physiology, is nothing but a mechanic, we simply quote from the *Cosmos:*

"To the specialist in dentistry, if he would rise above the level of mere mechanism, no knowledge is more important than that of the systemic relations of the tissues with which he is more particularly concerned. These statements are truisms ; no one denies the importance of this branch of learning ; but it is too commonly undervalued and lost sight of by the student and practitioner."

Our thanks are due to the several gentlemen who have favored us with items for the "Operating Table and Laboratory" department. We trust all such and many more will continue these contributions of practical importance. The *little* things of our every-day experience and practice, that perhaps to us seem trivial and unimportant, may be of very great advantage to some one else and go far towards making up the grand successful whole of our professional life. The fact that "it is more blessed to give than to receive" applies to other things than money.

The *Alabama Dental Association* will hold its annual meeting in Montgomery, Ala., on Tuesday, April 11, 1882.

At the forty-second annual commencement of the Baltimore College of Dental Surgery, forty-seven out of ninety-three matriculants were graduated. Plenty of music helped to celebrate the event so important for forty-seven new coming men ; the Dean, Prof. I. J. S. Gorgas, conferred the degrees, and Dr. Prof. Richard F. Gundry, M. D., gave the annual oration. The forty-second annual session will commence Oct. 16, 1882.

OPERATING TABLE AND LABORATORY.

Many years ago I experimented with Sulp. Morphine in dental cavities. I found that the narcotic effect produced on the tooth was relatively as to the density of the dentine. In young teeth the narcotism was prompt. The same effect was produced in old teeth or dense teeth, provided the dental pulp was covered with decalcified tissue. But the indiscriminate use of morphine for the painless excavation of cavities I soon abandoned. I still use a simple paste of morphia and oil of cloves for the above purpose, closing the cavity with wax for half an hour, while operating on a less sensitive tooth. For teeth of hard tissue or for *immediate* work, I use a paste of chloride of zinc and bloodroot. Take a drachm of powdered bloodroot and grind into it all the chloride of zinc crystals that can be to make a paste without the addition of water. It will receive water enough from the atmosphere to make a paste. This paste is allowed to remain in the cavity seven (7) minutes, without being wet. It causes some pain for half that time.

HENRY S. CHASE, M. D., ST. LOUIS.

A FORMULA FOR AMALGAMS.

Prof. Pierce gives the following: "Gold coin, 1 part; pure tin, 10 parts; silver coin, 14 parts. Melt the tin first, and then melt the gold and silver together, and pour upon the melted tin, fusing them well together." One of the essentials in making a good amalgam is in the use of *absolutely pure* tin. The "grained" or "pure drop tin" is well spoken of by some amalgam makers, and can be or *could* be obtained of Morgan's Chemical Works, 67 Fulton street, New York.

S. T.

Dr. Templeton: What do you think of using tin at the curvical margin for the sake of its therapeutic effects upon the walls of the cavity?

Dr. Black: I do not think anything of it. If fearful of impairing the margin of the cavity, I would use ammoniated foil, which is as soft as any tin. The extra cohesive foil (which condition implies the greatest softness, purity and cleanness) will become perfectly non-cohesive by a few minutes' exposure to ammonia, without in the least impairing its softness. It may easily be ammoniated by placing in a box or drawer together with a bit of spunk or cotton damped with spirits of ammonia and closed for a short time. It may be kept thus in a special box for use. It will become perfectly non-cohesive, so that it will not weld any more than tissue paper will weld, and makes the best cushion for margins that I have yet tried. I place such thickness as I may desire on my margin and then secure it by placing cohesive gold over it exactly as is done in covering the margins with tin. Whenever we have foil that is not cohesive after annealing, it is because there is something on its surface that heat will not drive off. Phosphorus and sulphur and perhaps many other things will accomplish that. Ammoniated foil is easily re-annealed, and then welds perfectly. Many of the things that are liable to make foil permanently non-cohesive are of an acid nature and the foil is protected from them by ammonia. All the metals are welding metals, if clean. Gold does not attract oxygen to its surface and so is easily welded cold. Platina does attract oxygen and cannot be welded cold, but by covering platina with gold we can get the welding property of the gold and also of the platina beneath it, and they will become a coherent mass under the plugger. Some persons spoil their gold by annealing in a lamp after touching the wick with the phosphorus or sulphur of the match.—*Trans. Ill. So.*

AN EXCELLENT METHOD OF TREATING RUBBER DAM.

After the piece is prepared for the mouth, both surfaces should be sprinkled with powdered soap-stone and well rubbed in by hand. The stone as prepared for the shoe trade, known as "Paris chalk," is a good article and it may be scented with something to disguise the sulphurous odor of the rubber that is so disagreeable to some patients. The rubber thus prepared will more readily pass between teeth that closely proximate than that as ordinarily used. It will be found that

the rubber prepared in this way will not tear as easily about the apertures in application to and removal from teeth. A piece of rubber lasts much longer treated this way.

In cases where a series of operations at short intervals between the sittings makes it expedient, for the sake of economy, to use the same piece repeatedly upon a patient, the use of this soap-stone after washing and drying before laying it away will keep the piece soft and fresh. All kinds of rubber dam should be kept in a *very dark, cool place.*

A few days ago I saw a full set of teeth on rubber plate which were lined on the palatine or gum surface with thin platinum plate. I asked the gentleman the object. He said his dentist told him that it would prevent the absorption of the gums. I replied that there was more humbug in it than common sense. What say you? E.

Having had no experience in the use of plates lined with platina, we can, of course, only speak theoretically. What we claim as giving rise to the evils attending rubber and celluloid plates, is first and mainly their non-conductivity; and, second, their filthiness.

Not one set in ten presented for repair are fit to come within arms-length, much less to be worn in a mouth. This is not entirely from negligence on the part of the patient, but is to a considerable extent owing to the tenacity with which the conglomeration of mucous, etc., adheres to them.

Gold, platina, and even silver are infinitely better in this respect, and if rubber plates are lined with platina so as to present to the mouth as perfect a surface as an entirely metal plate, we do not see why that portion at least is not just as cleanly. At the same time, there is somewhat increased conductivity, which is very much to be desired.

Let us welcome anything that will in the least alleviate the hot, peppery condition of mouths supplied with *either* rubber or celluloid plates—a condition, also, which is so rapidly and extensively followed by absorption of the alveola processes.

What the future is to be of the person who commences at the age of twenty or less with such dentures, is a problem scientists and philanthropists will soon be called upon to answer.

Look at your patients' mouths and ask questions—no, you will not need to ask questions, for it will all be revealed—and if you are conscientious you will have a sad heart.

Will querist be so kind as to inform us as to the thickness of the platina lining, how applied, and where it can be obtained?—Ed.

TAKING IMPRESSIONS AND OBTAINING MODELS.

Take the first impression for a full case with modeling composition; remove from the mouth before fully hard, if the alveolar border is prominent, and press back a little with the thumb the edges overlaying the most prominent parts. Mix the plaster in the usual way and pour it upon this unroughened surface and introduce it; when ready to remove from the mouth, the plaster will not cleave from the composition. Paint the surface with a thin solution of shellac in alcohol; when it is dry place the whole in a bowl of water; when the plaster has become saturated, which will take but a few minutes if the varnish is thin, remove from the water. Take the plaster intended for the model and put it in an excess of water; after it has settled and all bubbles risen pour off the excess of water before touching the plaster with the spatula, then stir and pour. If the tray that has been used is smooth and bright, it may be removed from the impression after the model is hard by first freeing the overlap on the edge and lightly tapping the handle. The composition should be warmed by dry heat and is removed easily, it being ready to lay away after washing.

After one experience, you will say, "No more wax for *me*."

TO ARREST HEMORRHAGE FOLLOWING EXTRACTING TEETH.

Take a pellet of cotton of suitable size, *partially* saturated with creasote; after which prepare the cavity or socket by syringing it out with tepid water; then touch the pellet of cotton, prepared as above, to a little nitric acid and immediately apply to the socket. Hold it in place for ten or fifteen minutes if necessary. S. T.

Very many teeth, mounted on rubber or celluloid are broken in *removing the plate and teeth from the casing* by hurry or carelessness; dentists often pry their flasks open in a hurry or rap the flask hard with a hammer to loosen the plaster, and by the concussion break the teeth opposite the blow. A few have found it out by sad experience, but more prefer to lay the blame on the teeth than to themselves.

E.

TO KEEP THE SPITTOON ODORLESS.

Throw into the spittoon before emptying and rinsing five to ten crystals of permanganate of potash. Always keep a little water in the spittoon and in this water about the same amount of the permanganate.

In case a "*barbe*" is broken off and fixed in the pulp canal of a tooth, so that it is impossible to remove it by mechanical means, pack the cavity with common salt, seal with "Hill's Stopping," and let it remain two or three days, when the "barbe" will be found to have become an *oxide* and can be easily removed by thoroughly syringing the cavity with water.

S. T.

For several years common rosin dissolved in ether has been used to seal the ends of (freshly-cut) tubuli and has proven of good service where common stopping has been used. Will some one give us the objections to the same treatment in preparing cavities for amalgam fillings, to prevent discoloration, provided the edge of the cavities be kept so the amalgam will come in contact with the enamel?

T.

BIBLIOGRAPHICAL.

Fractures of the Inferior Maxilla, by Dr. Thos. L. Gilmer, Quincy, Ill., illustrated by Dr. G. V. Black, Jacksonville, Ill. It is a paper read before the Illinois State Dental Society, May 10, 1881. If we have to expect any advance in surgery it is from such monographies as the one of Dr. Gilmer. The smaller the subject and the more exhaustingly treated, the better. It is an exceedingly well-given and carefully-compiled paper. But it is with good papers as it is with good women, the best are those about which there is little said, because saying in such cases unfortunately too often has to mean fault-finding. The cuts are very plain. The author is doubtless right in ascribing the displacement of the parts broken far more to muscular traction than to the blow itself which broke the jaw. A slight slip occurs on page 14, where the author says that at the time of Hippocrates a material for ligatures was platinum (fifth century B. C.). Hardly possible, since platinum was only discovered in the eighteenth century, A. D. But we do not wish to consider the monograph any less valuable for this slip. To enter into the many good suggestions for the use of splints, etc., would be of little use here. The pamphlet may prove very useful to every practitioner.

Dr. John J. R. Patrick publishes his paper on *Oral Electricity and the New Departure*, read before the American Dental Association, at

Boston, 1880. His views on the oral electricity are identical with ours, as given in the Independent Practitioner of 1879. Dr. Patrick shows himself a strong chemist, and it would be unfair to split words about a few of his statements that might be questioned. The statement that mercury is an intermediate between liquids and solids, etc., is untenable! While agreeing very well with the author in the first part, we would have to disagree thoroughly about his experiments, and, therefore, we better close. In our March number we discussed the question of the mercury vapor arising from *amalgams* enough to leave no doubt about the facts.

Medical Specialties, by Dr. John J. R. Patrick, is a very able paper. The author writes a far plainer style than the majority of dental essayists. What does he call "syphyloid diseases" in distinction from syphilis? They are either syphilis or not, and such an easy term should rather be fought than accepted.

SOCIETIES.

PROCEEDINGS OF THE BROOKLYN, (N. Y.) DENTAL SOCIETY.

Monday Evening, Feb. 13, 1882.

Subject for discussion: "Sixth-year Molars."

Dr. Wilder read a paper in which he compiled the views of Drs. Clowes, Lord, Kingsley, Atkinson and J. Smith Dodge, Sr., upon these teeth. Collating these as expressions of both extremes in regard to their treatment, he deduced from this compilation evidence of the necessity of a conservative practice.

Dr. Mirrick said that formerly he was influenced by the extreme views proclaimed of saving the sixth-year molars at all hazards, and found that it needed no little courage to remove them; and cited a case of several years ago where he was impressed that he ought to sacrifice all four of these teeth, although sound, yet they indicated to him "too much teeth." After some hesitation he ordered them out. Within two weeks the patient had come into his hands again, and he had had an opportunity of noting the results, and found the teeth in excellent condition, needing but little attention, and felt proud of the success of his plan of treatment. Such an experience impressed upon him the importance of this practice in a large number of cases pre-

senting themselves with arches so small there was no room for thirty-two teeth.

Dr. O. E. Hill endorsed Dr. Mirrick's views and added that he, too, knew that it required a good deal of heroism to go against the radical views which had been showered upon us in the past, but he said that times are changing, men are listening, reading and thinking before they act, necessarily with better judgment. Association has much to do with bringing this about.

Dr. G. A. Mills said there were two sides to the question. The theoretical and the clinical aspects should both be viewed and considered. Former discussions referred to were among the *possibilities* of being able to save the sixth-year molars, and so eager was the debate, the thought was lost sight of whether it was *always* best to save it. Now it is fully accorded that it *can* be saved as well as any of the others, and it *should* be when circumstances indicate the necessity for its being saved. We labor under no little difficulty in discussions like this, for we do not have clinical demonstrations at hand to exhibit results. We need *many* cases, not one or two, and they should be illustrated by models, or the patients, both before and after the treatment. Dr. Riggs, to my personal knowledge, has given this subject a prolonged and cultured attention, and had at one time a very large number of models showing the results of actual practice. Unfortunately, these were unintentionally destroyed, but I can bear witness to no little observation in this direction of his work, that it has exhibited a degree of uniformity of helpful results, certainly so far as relief of overcrowding, and correction of irregularity. This was doubtless due to wise discrimination in removing these teeth at the proper period of development. Dr. Riggs would extract these molars at the appearance of the bicuspids. I have observed the results from the hands of another practitioner who was a strong advocate for the removal of the sixth-year molars, but there was not that uniformity in results. While some were excellent, many of the teeth were out of position by an undue width of spaces; isolation of bicuspids, presenting proximal faces where buccal belonged; twelfth-year molars tipping, etc.

Dr. A. H. Brockway asked Dr. Mills to what he attributed these differences of results.

Dr. Mills: Lack of discrimination; thought he had arrived at good results in some cases by removing the second bicuspids instead of the molars.

Dr. Brockway held the opinion that generally better results were

secured by the removal of the molars, particularly in such cases as the one referred to "of too much teeth."

DR. MILLS said we were soon to discuss an aspect of this subject that had been but little considered or thought of for want of requisite knowledge, i. e., the value of a tooth; or, to put it in another way, the *disorder and disease* caused by the loss of a tooth from the arch. There is in this view of the subject vastly more worthy of our consideration than we are now aware of. Lateral support means something, and the loss of this support has a very potent influence on the conditions of the tissues, physically. Too much relief may be secured. Taking this view of the matter, we are reminded that all has not yet appeared to us that is to be known of this subject. When we *know* more of the building of tissues, we will discuss these questions understandingly and with profit.

Reported by "OUR SPECIAL."

THE CONNECTICUT VALLEY DENTAL SOCIETY will hold its semi-annual meeting at Amherst, Mass., June 29 and 30, 1882. The various Section Committees are arranging most interesting reports. An essay by Dr. J. L. Williams, of North Vassalboro, Me., is promised, entitled "Studies in the Pathological Histology of the Teeth and Contiguous Parts." This paper to be illustrated by a stereopticon. Arrangements are perfecting for the exhibition of a few microscopes.

Per order of Executive Committee,

A. M. ROSS, Secretary.

CORRESPONDENCE.

NEW YORK, March 17, 1882.

MY DEAR EDITORS: Consciousness of usefulness to the readers of the *Journal* would be a sufficient compensation for any communications given it. But there's the rub, for the new and the old, are so blended, by being alternately dominant and sub-dominant in the effort to attain the useful, that it becomes a herculean task to point out the useful in the new and the old, and the obstructive cogitations that lay behind the practical execution of works of the head and heart in presenting demonstrative explanations by which knowledge is attained and con-

summated. This enables us to do the least amount of mischief and attain the greatest good in our attempts to help ourselves and others out of the darkness of non-knowledge into the light of the clear comprehension of normal functioning, whereby we become able to distinguish health from disease, and to perceive the clear indications of how to remove the obstructions to natural processes, so that nature may resume her sway, or to devise the best possible substitutes for the lost tissues and organs that come to us for rectification, redemption, or substitution. BREATH becomes old by conversion into *blood.* Blood ages by the metamorphosis which makes it pabulum; and this by merging into protoplasm, and this into embryonal corpuscles, which in their turn ripen into the tissues which compose the organs or the machinery of the various functions pertaining to the human body. These are the stages through which the seriated energy of LIGHT is converted into all the modes of motion displayed in the mental, affectional and bodily manifestations of the transmuting of emotion into motion, or, when speaking of individual existences of emotions, into motions which reveal the typal limitations of systems, organs and tissues, whereby classification may be understandibly formulated. He who adequately presents us with the statement of the processes by which the unseen breath becomes the cognizable blood and all its derivatives, in tissues with predominance and subdominance of mineral, vegetable, animal, and human characteristics, will be the apostle of the revelation of involution and evolution, sustenance and destruction of all the bodies that depend for their maintenance upon food. Now, my dear Yankee boys, this is the text for you to work out, and crown yourselves legitimately "Sons of the East—Sons of Light"—*Real Illuminati.*

Ever the same, ATKINSON.

OBITUARY.

DR. M. S. DEAN.

Died, at Chicago, Ill., January 28, 1882—MASON STILLMAN DEAN, D. D. S., aged 57.

Perhaps never before in the history of dentistry in this country has the announcement of the death of a member of the profession been received with more sincere and universal sorrow. The expression of those most intimately associated with Dr. Dean is pathetic and touching in the extreme. The reason for this is apparent, we think, to even those

who have but *casually* met him. The exceptionally fine qualities of the man shone *clear* and *unmistakable* in every feature of his face, and to have known him in the closer relationships of social and professional intercourse must have been regarded as among the most helpful, inspiring and uplifting experiences that this world of ours affords. To thus in *reality* approach the grave, "like one that wraps the drapery of his couch about him and lies down to pleasant dreams," is a most fitting close to a life that leaves nothing but benedictions behind it. In addition to the many testimonials of his high character, we print the following from the

ST. LOUIS DENTAL CLUB.

At a meeting of the St. Louis Dental Club, held on Monday evening, January 30, 1882, Dr. Spalding announced the death of Dr. M. S. Dean, of Chicago. A committee was appointed to report suitable resolutions on the occasion. The committee subsequently reported the following, which were unanimously adopted :

WHEREAS, Intelligence having been received of the sudden death of Dr. M. S. Dean, of Chicago, therefore,

Resolved, 1st.—That in the death of Dr. M. S. Dean, the profession of dentistry has lost one of its brightest ornaments, and one of its most useful members.

2d. That few practitioners of dentistry have devoted their time and talents to the study and investigation of the more obstruse and occult branches of dental science, to the extent that Dr. Dean has done. The results of his labors in this direction have served in an eminent degree to familiarize dentists with the subjects of his particular line of study, and thus to largely promote a more general knowledge of this branch of dental science.

3d. That in appreciation of his merits as an investigator, and of his character and standing as a professional gentleman, he has been made the recipient of the very highest honor within the gift of the dental profession in this country, viz. : the presidency of the American Dental Association. He also filled the responsible position of recording secretary of the same body for several years, and discharged its laborious duties in a manner creditable to himself and highly satisfactory to the members of the association.

4th. That we sympathize with the dentists of our neighboring city in the great loss they have sustained by his death, and with the relatives and friends of the deceased in their sudden bereavement.

5th. That a copy of these resolutions be sent to the Chicago Dental Society, and to the dental journals for publication.

C. W. SPALDING, Chairman,
A. J. PROSSER,
WM. N. CONRAD,

Committee.

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ORIGINAL COMMUNICATIONS.

BONWILL CROWNS.

BY R. M. CHASE, D. D. S., BETHEL, VT.

[Essay read before the Vermont State Dental Society.]

In attempting to say a few words on the method of inserting artificial crowns on the roots of crownless teeth, I do so not because I have anything particularly novel to bring forward as regards performing the operation, but because I am desirous of drawing attention to, and evoke opinions upon, a principle which seems to me both scientific and useful. Since it is our misfortune to see the walls of frail teeth, that have been filled and re-filled, crumble like old pieces of masonry, should we not give to our patients something better than patched-up crowns or partial sets of teeth? Is a crown built up with gold, amalgam, or cement, really artistic? True, it may be artistic manipulation which performed the operation, but the result is—what? Not a concealment but a conspicuous sign of the handiwork of man. Is the usefulness of our professional attainments so unworthy of public recognition that it must make a gold mine or junk-shop of our patients' mouths to have our art appreciated? By no means. We have only

an occasional patient who is vain enough to want a display of jeweled teeth.

The operation of inserting porcelain crowns, especially incisors upon the roots of teeth, is perhaps as old as any in dentistry. Elderly people, who remember our art in its infancy, often tell us that the first dental work they ever saw were teeth with wooden pegs driven into the jaw, meaning of course crowns inserted on the root with a wooden pivot. One of the oldest and most eminent men in our ranks told me some time since that the first operation he ever performed was inserting teeth by this method. There have been many methods advanced from time to time in this direction—some very good ones, but too complicated for the average practitioner. No method has been accepted as practical and been brought into general use for all cases and conditions, until the advent of the so-called Bonwill crowns; and to convince you of this assertion, I have only to state that since Dr. Bonwill's article appeared in the August number, 1880, of the "Cosmos," from that time up to January, 1882, a space of seventeen months, 2,500 crowns were sold! They are supplied to us (thanks to the manufacturers) in almost endless variety, and for shape, color, and life-like appearance, they surpass all other artificial teeth extant. We can still improve them by grinding and shaping; also, when the original teeth were filled with gold, we can, with the aid of the diamond drill, make a cavity and insert a filling, which still further disguises the artificial look. Dr. Bonwill's first method of inserting crowns with bolt and nut failed to come into general use, not because it was very difficult to perform, but because it was not a practical method; and the time and expense attending the operation discouraged many from attempting it. His next step was barbed triangular wire. This was a great improvement on the former method, and accomplished good results, although the wire is inferior to the combination metal pins which are now furnished us, as it makes it necessary to cut away too much on the lateral sides of incisors. Besides, the pins are made of metal, which permits of the mercury amalgamating its surface, and it is absolutely stronger, being one solid body with the alloy. The combination metal is better in case of accident, for it can be drilled out very well compared to platinum or iridium, and the shape of the pins being much better adapted for fitting and strength than the wire.

In preparing the root for the reception of the pins and alloy, cut away as you would in fitting the old style pivot-tooth, so that the

joint will come if possible above the free margin of the gum, leaving the mouth of the root nearly flat. Then, with suitable drills and bur, enlarge the opening, remove all debris, and thoroughly cleanse the pulp canal by any means usually employed. Then fill the end or apex of the root with gold about one-third the length of it. This insures the root against an accumulation of gas. The root should be beveled at the mouth to correspond to the bevel in the crown. Make such under-cuts above the bevel in the canals as will thoroughly anchor the alloy in the root. The under-cuts in the crowns of incisors near the cutting edge anchor the pins in the face (labial), and its strength depends upon such anchorage. It is well to look at each crown with a glass to see if well under-cut in the incisors as well as bicuspids and molars, as some I find are not well made. In fitting the crown to the root, do not disturb the open mouth-bore, as it is specifically for holding the alloy in connection with the bevel in the root. Fit it as nearly flat upon the root as possible, leaving the margin as sharp as possible. The bevel in the crown and mouth of the root thus holds the alloy from slipping away from the pin, and makes it so dense when pressed home that there is no difficulty about displacement. Always remember to place the alloy in the root first, and after everything is in readiness for placing on the crown, force up a steel instrument large enough to allow the regular pin to be placed with a pair of forceps or pincers. Then tamp around it with a thin, flat-pointed instrument with biblious paper under the point of it—this serving to carry the alloy compactly. It is better to put most of the alloy on the root, and only enough in the crown to fill up around the head of the pin. By forcing on the crown you can see easily if there is too much or not enough of the alloy, and thereby take from or add to when necessary. Now, with a suitable adjuster, force the crown home. I may as well add here that adjusters are almost indispensable, as no crown can be put on and left at once without some such device, and one can not depend wholly on his fingers to accomplish this end. Having thus inserted the crown, ask your patient to call again on the next day, when you can burnish and finish the operation. If it is a bicuspid or molar, you can cut away some of the alloy and finish up with gold—this giving the operation a more perfected look to your patient and yourself. One more point is needful to remember in adjusting a porcelain crown: Look well to the occlusion. If the crown does not articulate with its opposite neighbor, the tooth is liable to come down a little and expose the point which impairs the beauty of

the operation, and it is much better for the health of the root to have it strike its opposite slightly.

I have given only a few points relative to performing this operation, as I did not think it necessary to enter into the small details, trusting you are all familiar with the several principles laid down by Dr. Bonwill. While it is a comparatively new departure, we can safely say it is a great boon to dental surgery.

DISKS.

Substantially as given before the American Academy of Dental Science, at the Fourteenth Annual Meeting, October 26, 1881.

BY HORATIO C. MERIAM, D. M. D., SALEM, MASS.

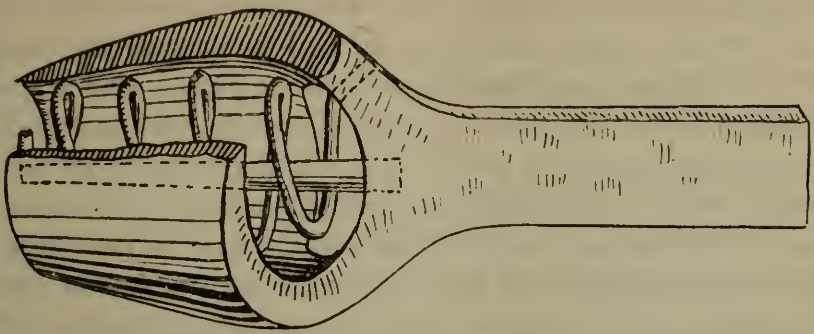
The request to publish the remarks made at the above meeting on Disks has made it necessary to write out what at that time I did not think needful to do—the matter being so entirely a practical one that I gave it without notes after reading my Essay, which was upon another subject. And I have added somewhat to that which I said then.

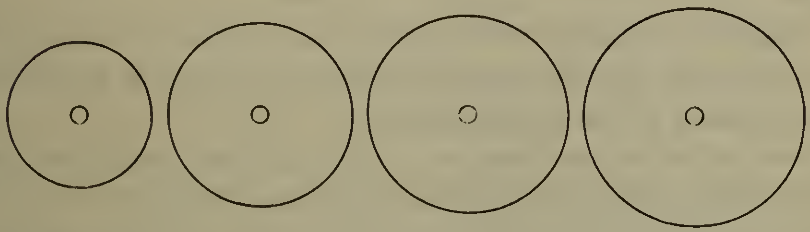
In bringing before you the Disks of sandpaper and other similar materials, I have first of all to disclaim any credit for them as first introduced—this belonging, as far as I know, to my ingenious colleague, Dr. C. A. Buxton, who brought them to my notice about two years ago, and who made them for his own use at a much earlier date, seven or eight years, I believe.

There were various objections to them, as made, that I have tried to overcome, and for these improvements I ask your attention.

The fact that they were not well centred does not seem to be much of a disadvantage, as we use them only on the sides. But the centres were merely pricked through when they should be cut out, that the disk may come up to a good bearing on the mandrel. This you will see has been done by the centre in the disk-cutter, which cuts out a distinct hole at the same time that it cuts a disk. The cutter or wad-punch of the gunsmith I have adapted for this purpose, by putting in a centre punch and spiral spring, to prevent the disks from working up this centre while cutting, and for throwing them out after. Should they still cling, however, a slight tap on the solid end of the punch will aid the spring to discharge them. The punch should be used with a mallet to avoid the spreading of the end, as would follow if a hammer were used.

I give these particulars that any one may make the cutter, or perhaps some of our manufacturers will do it for us. I get them so as to make disks of the sizes here shown.





The disks can be made of sandpaper, emery or glass paper, emery-rouge or crocus-cloth, or any material that may seem likely to polish or cut well. I have made some that are water-proof by putting quartz, very finely ground, of course, on to linen previously stiffened with shellac. But up to this time am not prepared to say how good they are. A coat of shellac on the cutting side of sandpaper makes them partially water-proof. I think, however, the profession can be trusted to improve in this matter until we get a flexible water-proof disk that will cut and polish.

The first step in the making of the disks I have here is to get from the carpenter or cabinet-maker a block, about the size of a sheet of sandpaper, of close-grained wood, made so that you cut on the ends, like a butcher's. This block should be beveled on the edges, that they may not be split off in use. On this the paper or cloth is tacked, smooth-side up. This is given repeated coats of shellac varnish. More than three a day are not given by mechanics who use it. About five coats will be found sufficient, if the varnish is of good body. One trouble found was, that in cutting from the sheet, the edges broke and were not firm. This was overcome by wiping the sheet over with sweet oil about ten minutes after it received the last coat of varnish, and cutting at once. We gain in this way a sheet covered with soft

varnish, but not sticky. The oil is also an aid in cutting, and the edges are compressed, wearing and cutting better. They should be allowed to season well after being cut before using.

The manner of use of these disks will of course be obvious to all, but until we give them a trial it is hard to understand their cutting capacity. They are very flexible and can be run at almost a right angle, and, with the end of an excavator, can be held so as to work on the rounding surfaces of teeth. For cavities in the labial surfaces of incisors, etc., I do not know of anything as good. If we wish to finish at the curvical wall without injury to the form of our filling, the butt end of an excavator can be held against the disk on the mandrel until the grit is worn off and we have an outer band or ring of cutting surface.

I would not consume the time of this society if I were not sure you would all be glad of what I have shown you, for all have been to whose attention I have brought them.

I have, of course, no interest in their sale—my only object being to give to the profession what I have perfected for myself.

April 5, 1882.

Under this date, I am glad to call attention to the first improvement. The Cutter is changed by Dr. Stevens, of Lynn, into a solid piece of steel turned out in a lathe so that there is no trouble from the springing of the centre in use. A thick rubber disk takes the place of the spiral springs. This is just the thing for making them, and it has the advantage that we can have them made of the best steel, whereas, the wad punches that I have seen are without exception inferior. They should be a little longer, I think, than those made by Dr. S.

EXTRACTS FROM MY NOTE BOOK.

BY GEO. L. PARMELE, M. D., D. M. D.

How often do we hear our patients exclaim, Oh, Doctor, I must manage to save my front teeth, just as if vanity could properly masticate their food.

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I don't know how long Aromatic Sulphuric Acid has been used in the treatment of necrosis, but when last in Brooklyn, my friend, Chas. D. Cook, M. D., showed me a book in the library of the Kings

County Medical Society—the 6th edition of which was published in London in 1757—which recommended its employment in this disease. Its title is, "A General System of Surgery, by Laurence Heister, Professor of Physic and Surgery in the University of Helmstadt. 6th edition; London, 1757." Can any one quote an earlier date? I think there is an impression among members of the profession that its use is of more modern origin.

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* *

We are often hearing of large dental bills, but I think by far the largest amount I have ever seen recorded as being paid for the preservation of a set of teeth, is the case of a Jew in the time of King John, of England. At that time, in England, as now in some parts of Europe, the Jews were numerous, wealthy, and thought fair prey, as everybody hated them. In reading of the Regicides, Whalley, Goff and Dixwell, I found this little narrative, showing one of the ways King John had of raising money, also showing the value put upon teeth.

"A story is told of a rich Jew in Bristol who was ordered to pay ten thousand marks—about thirty-three thousand dollars—equivalent, at least, to three times as much at the present day. This he refused to do, and was sentenced to have one of his teeth knocked out each day till he complied. The executioner began with the double teeth, and took seven in as many days, when the victim could hold out no longer, and agreed to pay his money to save his teeth."—*Three Judges, by Israel P. Warren.*

Here we have a recorded case where ninety-nine thousand dollars was paid to save twenty-five teeth.

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* *

It is said of the same King John, that when the parchment containing the famous MAGNA CHARTA was handed him to sign, he cried out profanely, "Why do they not demand my crown, also? By God's teeth, I will not grant these liberties, which will make me a slave!"

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* *

The following incident concerning transplantation was written out for me by a descendant of the gentleman mentioned:

"Governor Thomas B——, of South Carolina, was a man of great ability, determination and promptness, the possessor of large wealth, and the owner of many slaves; distinguished also for his remarkable kindness in governing them, as never, under any circumstances, would he allow flagellation to be used. About the year 1817, his son, a lad

from twelve to fourteen years of age, fell over a large log-saw, and broke out one of his teeth. The tooth was the lateral incisor on the left side of the upper jaw. Before the roots of the fractured tooth had time to settle again, the governor called up his young negro slave, Henry, and purchased one of his incisors, which was immediately placed in position in his son's mouth. Henry was a light copper-colored Charleston negro, of about the same age as young B. Although the transplanted tooth was a trifle larger, it took naturally and kindly, occasioning no trouble of any description, but supplied the place well and serviceably. This tooth young B. wore probably as long as he lived."

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How aptly the following quotations from a newspaper article, entitled, "The Dangers of Poor Pay," apply to dentistry: "It is a safe general proposition that any sort of service or work, public or private, that should be done at all, should be paid its value. If it is not, one of two things invariably follows—either the service or work are not well performed, or payment is got surreptitiously, and these two cheats usually go together." . . . . "So long as cheap work is what people demand, there is no use in grumbling when the cheap products fail us. Whether it be dams or sewers, or houses that fall; or food that makes us sick; or bridges that break; or boats that go to pieces, it is all the same. To get the proper thing, a proper compensation must be given. Good engineers who charge fitly for their labor, and who do solid work, are derided by the ignorant and left often idle to sit by and watch the work of their inferiors crumble away."

The State Board of Health of Illinois does not recognize diplomas coming from the College of Physicians and Surgeons of St. Joseph, Mo.—*N. E. Med. Monthly.*

The *English Medical Press* gives the following warning: We are concerned in the interest of impressionable females, and weak-minded young men to notice the arrival in England of Messrs. Moody and Sankey, of explosive revival fame. Former experience of the pernicious influence of the hystero-religious mania with which these men were identified lead us to hope that most people will guard against any undue preponderance of the emotional passions.—*N. E. Med. Monthly.*

SELECTIONS AND ABSTRACTS.

AN INVESTIGATION INTO THE EFFECTS OF ORGANISM UPON THE TEETH AND ALVEOLAR PORTIONS OF THE JAW.

BY ARTHUR S. UNDERWOOD, M. R. C. S., L. D. S., ENG., AND W. J. MILLES, L. R. C. P. LOND., F. R. C. S. AND C.

Read before Section XII. of the International Medical Congress, August 6, 1881.

Mr. President and Gentlemen: Mr. Milles and myself approach with some diffidence the task of laying our views, in their infancy, before a body representative of science from all parts of the world. In the presence of so many illustrious members of our profession, whose own well-established researches have so materially advanced surgery in all its various departments, we should scarcely have ventured to address you without some apology or excuse; we have only one to offer, yet we think it is one you will all sympathize with and appreciate. It is a firm and rooted belief in the truth of our theory, and a hope, almost amounting to a conviction, that it will prove serviceable to humanity. Without further preface we will proceed to discuss it.

The effects of the presence of septic organisms in various parts of the body have been for some years the subject of vigorous discussion and inquiry. Up to the present time certain main facts have, we consider, been placed beyond doubt, and accepted by the general body of scientific men as incontrovertibly established. We shall therefore assume as axioms in our present inquiry, the main principles of the antiseptic theory. The object of our inquiry (undertaken some four years ago) has been to determine, as far as possible, to what extent germs are present in the dental tissues when in a state of disease, and to deduce conclusions as to the effects of their presence. The method we have pursued has been threefold:

1. *Microscopical*—The observation of numerous sections of morbid dental tissues, stained in such a manner as to render the germs plainly visible.

2. *Flask Experiments*—The exposure of dental structure in a healthy condition to the action of septic and aseptic fluids.

3. *Clinical Experiments*—The treatment of morbid conditions of the dental tissues with antiseptic agents.

The results of this threefold investigation have uniformly led us to the conviction that germs play an important part in the production

and maintenance of morbid conditions of the dental tissues. With regard to the principal calcified dental tissue, dentine, and its destruction by caries, it is necessary to allude, for a moment, to the most commonly received views of the etiology of the latter disease. The old "vital theory" may be passed over, as completely disproved by the successful experiments of M. Magitot and many others, who have produced caries in teeth not in connection with the living body. With regard to the purely chemical theory, we cannot accept it as wholly satisfactory, for the following reasons :

1. Because the destruction of dentine, effected by the action of acids alone, under aseptic conditions, does not resemble caries, either in color or in consistency, it being colorless and gelatinous, the process uniformly attacking all parts of the surface.

2. Because sections of dentine so destroyed show uniform destruction of the matrix, but not enlargement of the channels occupied by the fibrils ; whereas, true caries first attacks the soft tissues, *i. e.*, the fibrils, and encroaches from that *point d' appui* upon the surrounding calcified structure, thereby producing the characteristic enlargement of the channels, until two channels break into one, the intervening matrix being wholly destroyed.

3. That, although artificial caries has been produced exactly resembling true caries, we have failed to discover any record of an experiment in which this has been the case when septic influences were excluded. Two experiments have, indeed, been recorded in which the teeth were protected from septic agencies, in one by the addition of creasote ("Tomes' Dental Surgery"), in the other by hermetic sealing of the flask, and in neither of these did caries occur. We assume, therefore, that two factors have always been in operation : (1), the action of acids ; or (2), the action of germs. Further, our own flasks show that malic and butyric acids, with saliva in a meat infusion, have not, under aseptic conditions, produced caries.

It may be asked, if the tooth has been decalcified by acids out of the mouth, and these acids are constantly in action in the mouth, then if they produce caries, why can they not produce simple decalcification? To this it may be replied, that acids alone do not destroy a living tissue ; that the stomach is not digested by its own acids until it has been removed from the body.

4. Lastly, we would urge that, when caries occurs in the mouth, it is always under circumstances more favorable to the action of germs than to that of acids. There is always, first of all, a minute pit or

haven where germs can rest undisturbed and attack the tissue. We cannot, upon the purely acid hypothesis, explain why the same acids that originally caused the decay, gaining access through some minute imperfection of the armor of enamel, do not in the same mouth, or under the same condition, attack the wounded enamel at the edges of the filling. The germs cannot rest there, they are constantly washed away if the surface is fairly smooth; but the acids literally bathe the part except during the performance of the act of mastication, when the alkaline parotid and submaxillary saliva neutralize their action.

These considerations led us to seek for signs of the presence of organisms in carious dentine, with results that far exceeded our expectations.

This theory—which, for the sake of distinction, may be called "septic"—is rather an amplification of the chemical theory than a contradiction of it. Most probably the work of decalcification is entirely performed by the action of acids, but these acids are, we think, secreted by the germs themselves, and the organic fibril upon which the organisms feed, and in which they multiply, is the scene of the manufacture of their characteristic acids which, in turn, decalcify the matrix, and discolor the whole mass.

From our observation of cementum to which caries has extended, we conclude that the process there is very similar; the bioplasmic contents of the lacunæ and canaliculi afford board and lodging for the organisms, which multiply, and when sufficiently numerous, decalcify the surrounding bone so that the lacuna loses its outline and extends in all directions.

With regard to the pulp, its inflammation does not materially differ from that of any other cellular connective tissue. The influence of germs upon such tissues, when inflamed, has been already demonstrated by Professor Lister. One peculiarity distinguishes this from kindred tissues, and that is that a tooth being an absolutely shut box, its contents are singularly amenable to antiseptic treatment. Having once rendered them aseptic by means of a penetrating agent, it is easy to keep them absolutely so by sealing the only opening of the cavity with a filling. With a view of testing this fact, the theoretical accuracy of which we could not doubt, we have repeatedly allowed the gangrenous contents of a pulp cavity in which suppurative inflammation has gone on, to remain in the tooth covered by a filling.

All that is necessary to prevent further disturbance is to soak them in a powerful antiseptic. I have chosen for this purpose a combina-

tion of iodoform and eucalyptus oil, because it is the most powerful and the most permanent in its effects. After a certain period, during which the cavity has been sealed with a temporary filling, if no disturbance has occurred, I have substituted a permanent filling, and almost invariably with the most satisfactory results. This treatment is, I think, eminently conservative surgery and based upon sound surgical principles.

M. Magitot, in a recent most interesting article upon the development of the teeth, lays great stress upon the fact that the odontoblast layer is very essential to the health of the tooth; and if we can, by this method of dealing with the matter, avoid the otherwise necessary alternative of removing it, together with all dead matter, we certainly give the tooth an extra chance. The more of the natural vital contents of the pulp cavity we can preserve *in situ*, the better for the tooth.

Further, we would propose for your consideration a theory as to what is the probable course of behavior of a tooth pulp under these circumstances—at present only a theory, but one which we hope to establish shortly by ocular demonstration, and lay before you in a mature form. Suppose a tooth, with a large cavity communicating with the pulp-chamber; suppose that gangrene and suppuration have extended down two-thirds of the pulp-chamber, and that the extreme periphery of the pulp (membrana eboris), and the contents of the apex of the root alone remain alive; suppose the cavity cleared, a small portion of the surface of the slough removed, and the rest carefully soaked with eucalyptus oil until all the existing organisms are destroyed, and the cavity then filled with a permanent and effectual stopping, what becomes of the slough? In every other part of the body a slough that has been rendered and kept aseptic is gradually absorbed by the neighboring vessels, while new cicatricial connective tissue is laid down in its place. This has been repeatedly demonstrated in sloughs of the limbs treated antiseptically. We therefore suggest that the same thing that happens in other parts of the body, under similar circumstances, happens in the pulp-chamber; the slough is removed gradually by absorption, while its place is supplied by healthy cicatricial tissue; like all scar tissue, it is of a lower order than that which it replaces, but it is a living tissue. After a lapse of time, then, we imagine that, if the tooth in question were extracted and split open, its contents would be found to be a healthy connective tissue, and not a slough at all.

Experiments on the Living Subject.—Taking, then, for granted the facts established by Lister and others, relative to the effects of the presence of organisms in other tissues, we were convinced that the course of an alveolar abscess was also profoundly modified by their presence. An aseptic or a septic alveolar abscess seemed to us to differ very much in the same way as a simple and a compound fracture.

To render such abscesses aseptic, we have injected them with eucalyptus oil and iodoform, and dressed them with lint soaked in these substances.

By means of constant and careful dressings and injections, we have been for the last two years very successful in inducing extensive and often oldstanding alveolar abscesses to run a rapid aseptic course of recovery. Wherever we have failed, we have been able to trace our failure to the presence of a sequestrum, which has afforded an inaccessible refuge for organisms, and which, until nature has rejected it, or surgical skill removed it, has kept up the mischief despite all applications. Mr. David Hepburn, in a recent able paper read before the Odontological Society, urged this fact very strongly and clearly, and we quite agree with him that, while dead bone is present, antiseptics may mitigate, but are powerless to annihilate the disease.

Microscopical.—The sections from which our observations have been made, have been cut from fresh teeth, very shortly after extraction, and without the use of any decalcifying or softening re-agent.

We have subsequently stained them with an aniline dye (methyl violet), following as closely as possible the process recommended by Koch—a process which renders micrococci fairly distinct under a $\frac{1}{8}$ lens, with proper illumination. A few typical slides we have been enabled to show you, owing to the kindness of our friend, Mr. Nelson. I need scarcely add that as the powers are very high oil immersions ($\frac{1}{60}$, $\frac{1}{32}$, $\frac{1}{25}$,) we shall ask you to refrain from touching the adjustments. We have also prepared some diagrams illustrating upon a larger scale the appearance of the objects. In dentine, which has occupied most of our attention, we have invariably discovered the channels containing the dentinal fibrils more or less infiltrated with germs—for the most part micrococci, oval and rod-shaped bacteria. These germs we find penetrating, at first in Indian file, then more thickly, along the course of the fibrils. As they accumulate and choke up the channels, they encroach upon the matrix, diminishing the distance between the fibrils until the matrix entirely disappears,

the neighboring channels join, and the whole tissue becomes one conglomerated mass of organisms. Beyond the sphere of visible decay, sections cut from apparently healthy tissue show here and there a narrow line of micrococci or bacteria, like an advance guard, and such isolated tubes or germs probably penetrate far into tissue which the naked eye would pronounce sound.

In decay which has appeared in blocks of hippopotamus ivory worn on a plate, we have observed very similar appearances, also in some caries which we have produced ourselves in a flask, by exposing a sound tooth to septic agencies.

In cementum hitherto we have experienced some difficulty in obtaining sections of tissue into which caries has penetrated; but where we have succeeded, we have found the lacunæ filled with germs. In some lacunæ, the protoplasm of the osteoblast cell is slightly stained, the nucleus very deeply, and a few germs are seen scattered about in little groups. In others, the protoplasmic contents of the space appear to have been totally destroyed, the outline lost, and the whole lacuna crowded with germs.

Summary.—The preceding observations, together with the experiments with flasks and upon the living subject above referred to, have led us to adopt certain views which may be regarded as an extension of the views previously held upon the matter.

1. We consider that caries is absolutely dependent upon the presence and prolification of organisms. That those organisms attack first the organic material, and feeding upon it, create an acid which removes the lime-salt, and that all the differences between caries and simple decalcification by acids is due to the presence and operation of germs. This view we propose to call the "septic theory."

2. That suppuration of the pulp and its sequelæ, such as alveolar abscess, depend also upon the successful working of organisms.

3. We feel justified in concluding that the successful exclusion of germs would prevent the disease, and that their exclusion is quite easy and practicable by the use of powerful and penetrating antiseptic agents, such as eucalyptus oil.

We have found that the space of time allotted to a paper rendered it quite impossible to enter into all the details of treatment and experiment we could have wished. These experiments have extended over three years, and cannot be condensed into a half-hour paper. All, therefore, that we have been able to do has been to lay before you the main facts and a few typical results, and in doing so we have been very kindly assisted by Mr. Nelson, whose microscopical arrangements have enabled us to show you our results in a more perfect manner than would have been otherwise possible.—*Journal of British Dental Association.*

EDITORIAL.

An "old New Englander," but now of Paris, writes us as follows regarding the *Journal:*

"I have received two numbers of the New England Journal, and very soon afterwards every word was read; although so young, it seemed like an old friend, and I took it to my heart at once. I most heartily congratulate you and your associates—the parents of this vigorous "offspring"—upon an issue, the excellence of which assures its brilliant future. It certainly raises its scientific head above *all* dental journals of to-day, and in *no other* respect can I see that it suffers in comparison with the best." . . . . "I have been in Paris five months, but the time seems very short, and I am enjoying myself much. January and February are the dull months, as people are all South, but the season is now getting lively." . . . "Our practice is composed mostly of Americans and English, but we see enough French to find that they are very bad patients as a rule, and French dentistry is worse than the patients. The worst operations, however, that I have seen, come from England. The self-sufficient 'John Bull' doubtless thinks he has done a wise thing in making requirements for the admission of foreign practitioners so severe. *That,* with their present *fee* system, is about as great a block to progress as could be used; for, to restrict a class superior to the one protected, is an imposition upon the public; and if the idea is to hasten progress by allowing only *best* men, it yet fails, for progress in conservative England is slow as regards the practice of professions, and I believe that about the poorest American that goes to England will produce better results than the average English dentist, with even a larger amount of *unapplied* science."

Dr. J. Chenon, of New York, found capsicum good in hemorrhages of the uterus; he gave a two-grain pill before every meal, increasing to six pills a day.—*N. E. Med. Monthly.*

Might it not be good in dangerous hemorrhages connected with dental operations?

We call attention to our "*Special Notice*" in the advertising columns this month. Very many, doubtless, who have not already become subscribers, have intended to do so, but for various reasons have delayed sending in their names. Let all such improve this opportunity, and send in their names and dollars at once.

Mr. Stephen Jenner, grand-nephew of the discoverer of vaccination, and himself in childhood the subject of many of his uncle's experiments, is living at the age of eighty-five, in great poverty at Heathfield, England.—*N. E. Med. Monthly.*

Here we have a genuine bad effect of vaccination. Let the anti-vaccination men rank this other bad effect among the great number (?) of diseases that result from vaccination—poverty! His health is so far undermined by vaccination-experiments that, at the age of eighty-five years, he cannot yet die!

We give this month a few more "Extracts" from Dr. Parmele's "Note Book." The "crumbs" that he has thus gathered up constitute quite a large volume, and our readers may expect from time to time entertaining "peeps" therein. We understand that the Dr. not only carries his *scissors* in his pocket, but his *pencil* as well, so as to be able to note, on the spot, any little incident or remark that he hears, or *clip* any item that comes to notice having a direct or indirect bearing upon dentistry. As a "*relish*" to go with some of the *scientific* meat, we deem them excellent.

The *New England Medical Monthly* is very severe on dentists who use chloroform where ether would be sufficient, and it seems to us with great justice. We remember very well that the then leading surgeon of the University of Munich, Dr. Nussbaum, said that he trembled every time he had to give chloroform. If we compare with this natural and reasonable dread of so dangerous a drug, the relative ease with which dentists administer it, we have, unfortunately, to think of the proverb in which it is said, that something is bliss when something is folly. A dentist should never administer chloroform without a thorough medical practitioner with him for cases of accident. The editor of the *Medical Monthly* thinks the only remedy against such careless handling of this dangerous drug would be to forbid by law the use of chloroform for dental operations, and, as we think, it might be done safely without too much discomfort to dentists and to patients.

RAMBLINGS AMONG THE JOURNALS.

The *Missouri Dental Journal*, of February, 1882, opens with an address of Dr. J. Campbell, president of the St. Louis Dental Club. This address commences: "As this Club has inaugurated a new departure in dispensing with a code of ethics," etc. (!) The speaker, Dr. Campbell, makes the very sensible distinction between mechanical dentistry and medico-surgical dentistry, and says that at least five-sixths of a dentist's business concerns the first kind of his art. Dr. Campbell thinks it is asking too much of a dentist to require him to go through all the medical curriculum of a doctor to be able to do much in his art. This may be true, but the doctor seems to us to take too low an estimate of the capacity of human brains, if he assumes that, because practical dentistry "will require from three to seven years' time to learn," the student who spends this time for the mechanical drilling and filling cannot study anything in the meanwhile. He is not only able to do it, but even very lazy, if he does not spend at least half of this time in theoretical study. The advice to "let the dentist study medicine to the extent that it will subserve his purpose in his own profession, just as he would study chemistry, metallurgy, or any other branch of science or art," is rather dangerous. Medicine cannot be taken up in parts, unless it is a thorough training in the scientific foundation, and then leaving off other special fields, turning into dental specialities. As medicine consists far more in anatomy, physiology, pathology, than in prescriptions, etc., a dentist never will be an educated man without these branches. This pleading for special training before any shadow of the general principles underlying them is known, is dangerous, because it encourages that laziness to which we are all given, and for which we are glad to get any plausible excuse. But, on the other hand, he is right in not thinking it necessary for dentists to acquire the title, M. D. He uses a slight sophism in supposing a dentist to require seven years for his preparation, while a common doctor could do it in three years. Rather the opposite, doctor! Then, that talking about "good" dentists and "not good" dentists is so very vague, that in fairness it might better be omitted.

The *Dental Register* of February, 1882, opens with a paper read at the International Medical Congress at London, August, 1881, by Walter H. Coffin, F. C. S., which deserves careful reading. He speaks very highly of steel as the best material for regulating deformities, as far as springs are needed for this purpose. It seems that American doctors are somewhat afraid of it, though we do not know the exact

cause. They use all kind of combinations of gold and copper, none of which is as effective, easily accessible, and strong as simple, cheap steel. Dr. Walmsley gives very detailed hints as to microscopical preparations; most of them seem good to us. He rejects oil of turpentine on account of its "foul smell." We do not think this any objection, because to us and many others the oil does simply not smell foul. But, aside from that, we do not doubt that, with the directions given, one may prepare a house-fly most satisfactorily.

Items of Interest is a small dental paper, full of all kinds of useful information. As to the March number, 1882, we should like very much to ask the editor, before criticising, to read an article thoroughly, and not ascribe to us sayings which have no sense whatever. The editor, criticising on our article on Vital Force, says that the conclusion to which we came was: "Life is a circulation." For heaven's sake, do not believe that we thought only a moment of such a nonsense! Dr. Marshall H. Webb, of Lancaster, Pa., gives a long paper on filling a tooth. We need not say that the article is excellent. In an editorial the editor writes about "the Blood is the Life," evidently as a kind of reply to our article about vital forces. Now, blood is a substance, while life is a force, hence, how can blood be life? This is contrary to every logic; but if we put the proper logic into the little article we are astonished to find that the editor of the *Items of Interest* has the identical view about life that we have; that is, that the last factor of the many factors whose resultant is called "vital force," is circulation; for what else does it mean that "blood is life," if it is not circulation of the blood. Slowly but surely the "*Items of Interest*" accept the bioplasson theory. Many interesting little articles are given, most of them bright and good, but we cannot enter into them in detail.

Number 2 of the *Southern Dental Journal*, March, 1882, published at Atlanta, Georgia, contains some valuable original articles. One of them is a paper by H. E. Beach, D. D. S. It deals with the subject of the demands from dentists for proper performance of their duties. Very good, seems to us, this passage: "I say, and that with emphasis, that if the faculty of any college will confer degree of their institution on any man whom they know to be morally and professionally impotent, such an institution ought to have their charter repealed, or the trustees ought to secure a change in the faculty." The editorial department we consider slightly weaker in this number than the department of original communications. The editor's article on food adulterations is very much overdrawn. Having been in the

business of a chemist for quite a number of years, and employed by cities and courts, we cannot agree with the opinion of the author, that "pure sugars and milk are always unknown;" we never found sugar adulterated to any considerable extent. Water is all that is added to milk; we never found anything else. That "imported teas" are colored with chromate of lead, as the editor says, is not based upon facts. That "white earth constitutes three-quarters of the ingredients of bitartarate of potash," is astonishingly new to us; that "arsenic is used in making candies" is a startling assertion, without any backing whatever. Because, now and then, under particular circumstances, such substances have been discovered in food, there are a number of clamorers who let loose their fancy and speak in a general way, which is just as unscientific as it would be to conclude from one murderer being an Irishmen, that all murderers are Irishmen, or all Irishmen murderers.

The *Missouri Dental Journal* for March, 1882, contains as first article our sharply criticised article of E. S. Talbot; we wish every one who likes to view that paper of Dr. Talbot's in the true light, to read our article about it in our March number. We were then rather too mild than too severe.

Operating Table and Laboratory.

We have been using some of Dr. Meriam's "Sandpaper Disks," which he kindly sent us, and do not hesitate to say that they are a very valuable acquisition to our list of appliances. We are surprised at their durability, rapidity of execution, and adaptability to varied cases.

Why cannot something of the kind be made to use with "*crown* fillings?"

Dear Editors: For the benefit of Dr. Parmele and others who desire to know how sandpaper disks are made, it may be said that at the April (N. Y.) Clinic, Dr. Watkins, of Montclair, N. J., exhibited sandpaper disks, shellac varnished, that he claimed were water-proof. He had devised a punch with a rubber core and central punch point. The prepared paper is placed on a hard, level board, the punch used, and a disk is the result, ready to be mounted on mandril. M. A.

It is not the polished or expert operator that will save the most teeth or do the greatest good in his profession, if he lacks the judgment to make a proper diagnosis of his case, or is a one-idea man.

E.

To remove labels from bottles, first wet the label with a little water, and then hold over a flame of a gas jet or spirit lamp for a minute or two. The heat produces a slight steam vapor which very readily loosens the label, saving a large amount of time.

"To Keep the Spittoon Odorless."—Throw the spittoon, stand and all, into the ash-barrel. Two or three little cups on the top of the cabinet are far more convenient and wholesome than a spittoon, and can be kept perfectly clean by proper care. "Cleanliness is godliness" (without potash).

T.

Will Dr. Parmele please tell us, through the Journal, more in detail his method of preparing and using "gutta-percha dissolved in eucalyptol," for root-fillings? Also if, in his opinion, cotton moistened in eucalyptus would not serve equally well for the same purpose? and, furthermore, if he has ever used the same in cases of abscess?

D. D. S.

In some cases the phosphoric acid used in the oxyphosphate filling becomes deliquesced or watery to an extent to impair its usefulness. It may be restored by placing the bottle uncorked in a sand-bath, and placed over a gentle heat for a short time, when the excess of moisture will be driven off. If, on cooling, it (solidifies) crystalizes, add a few drops of water, and it will soon become liquid again.

The engravers and watchmakers of Germany are said to harden their tools in sealing-wax. The tool is first brought to a white heat and then plunged into the wax. After an instant it is withdrawn, and the plunging is repeated until the steel is too cold to enter the wax. The advantages claimed for this method are that the steel becomes almost as hard as the diamond, and, when touched with a little oil or turpentine, is superior for engraving, and able to pierce the hardest metal. Will some dentist try this method and report?

If in mounting a set of teeth on celluloid, whether gum or plain, you allow the approximal surfaces to be in contact when you case up preparatory to pressing your plate, you will very likely find one or more of your teeth or blocks broken. E.

Iodide of zinc is recommended by Dr. Harlan, of Chicago, as a pain obtunder in excavating sensitive dentine; also for injection through fistulous tracks of alveolar abscesses, in the proportion of water, ℥ss.; iodide zinc, grs. xii. The same proportions are effective in treating pyorrhœa alveolaris, used on wooden point dipped into the solution. And almost any condition of gums depending upon chronic inflammatory causes is benefited by the local application of this form of zinc, used in different proportions.—*Southern Dental Journal.*

A good gutta-percha filling material for temporary fillings, or even quite serviceable ones, can easily be made in the following manner: In a common teacup (thick one preferred) place a portion of the common red gutta-percha which is used for base plates, also pulverized pumice stone, in proportion by weight about two parts of the former to one or more of the latter. Place over a heater till sufficiently warm to make it possible to thoroughly incorporate the two articles. The rounded end of a hard-wood stick, or the end of a common file-handle, will serve in the process. Remove the cup to the work-bench while kneading, as considerable strength is required. Avoid an unnecessarily high temperature. Finally, remove from the cup, and roll into a convenient form for use.

Having a case of very "sensitive dentine" to-day, the idea occurred to me to try nitrous oxide gas, *a la* Dr. Rich. My patient was a brave common sense young lady, who endured the pain incident upon preparation of the cavity with heroic determination; but, notwithstanding which, I think I should have failed to properly prepare it had I not tried the gas. Three or four rather full inspirations of the gas permitted me to complete the excavations without the least unpleasant sensation, requiring about ten minutes' time.

I need not say that my patient appreciated the effort and rejoiced in the result.

My impression was that I could have worked several moments longer, if necessary. I certainly could have done so with one or two inspirations more of the gas. S. T.

FILLING ROOTS.

In a practice of over thirty years, I have tried various modes, such as gold, "bone," gutta-percha, and shellac, or sandarach. I think it is more than ten years since I made shellac a constant root-filling. It has been more satisfactory than any other. Early in its experimentation, I tried this: An upper molar, with its three roots, was held upright so as to represent its position in the head. Cotton dipped in a thick alcoholic solution of shellac was placed in a decayed crown cavity, having pulp cavity open. The cotton was squeezed with a plugger, and an endeavor made to force the solution into the roots, the *ends* of the roots being sealed. The confined air resisted the entrance of the solution more or less, and less and less air being expelled *through* the solution, after a while I concluded that the solution had filled the roots. Then small fibers of cotton were forced gently into the root canals as far as easily attainable. The cavity of decay was closely packed with cotton and the solution. Now the tooth was put in a tumbler of water, and left to remain for one week. At the end of that time, the tooth was removed and examined. The cotton had become pretty hard, for the water had extracted the alcohol of the solution, and only gum-shellac and cotton were left to form the plug.

The roots were now cut with a file on one side down to the canals, on all three of the roots, exposing the canals for a quarter of an inch. The canals were found to be filled with nearly dry sandarach-gum, which had hardened there, and had run into and varnished the minutest hair-like canals of the roots.

Several experiments of this kind were made with various classes of teeth, and the results were so satisfactory that this mode of filling roots in the mouth became my regular practice. The results in the mouth have given the greatest satisfaction.

In a practical case, the roots should be freed from water or saliva by washing the roots repeatedly, at the same sitting, *with alcohol.* If water is left in the roots, the "solution" will not flow well, and the gum will be precipitated by the water and alcohol uniting in the roots, and then the water will stay there. Nothing but the "solution" and cotton should be in the pulp cavity and root canals, and then the free water or saliva of the mouth will extract the alcohol from remote portions of the solution.

It is probable that the water contained in the hard substance of the roots extracts a portion of the alcohol.

Even if a canal is not filled solid with the gum after having its alcohol removed, yet the sides of the canals are varnished, the pores filled, and thus strange fluids kept from the canals.

The results are highly satisfactory, and I should not write this if I did not wish the young men to commence a practice which yields so much satisfaction.

The pulp cavity should be prepared and treated in the usual manner, or, at least, in the best manner, before the filling of the roots. The killing of pulps and preparation of such teeth for filling is a subject big enough for a separate article. Sandarach solution is just as good as shellac.

HENRY S. CHASE.

SOCIETIES.

PROCEEDINGS OF THE BROOKLYN (N. Y.) DENTAL SOCIETY, HELD MARCH 13, 1882.

The society voted to accept the offer of the Kings County Medical Society of an associate use of their library rooms; also voted money to subscribe for the several dental journals of this and other countries and purchase miscellaneous books for reference upon subjects pertaining to the interests of our specialty. It was stated that money and books were to be donated by members. This indicates a step in the right direction, as it secures an additional supply to the nucleus of a library already on hand. This move is in harmony with the signs of the times—*more knowledge;* our calling must be placed upon the plain of liberal education that characterizes other professions, and then the more generous hand, public opinion, will be given us. These are *facts*, and it is but wise to recognize them.

DR. BONWILL, of Philadelphia, was present at the clinic held monthly in the afternoon previous to the meeting in the evening—clinic at White's Depot; meeting, at Dr. A. H. Brockway's house. The Dr. gave a clinical lecture upon the history of the manufacturing of his porcelain crowns, to their present status, and the modus operandi of setting them. Also he exhibited his twenty-seven per cent. of gold amalgam, his engine-impressed nut or hand-piece for grasping the points, and his mechanical mallet attached to the engine. This was regarded with particular favor. It was demonstrated upon a filling by

several, and expressions indicated the belief that it would prove a strong aid to the electric engine of his invention. If so, the price—twelve dollars—brings it nearer the small purse of many worthy practitioners who cannot yet afford about sixty dollars for the other, and the difficulty of the battery is set aside. This mallet certainly did work nicely, the blow being easily regulated by the speed of the engine. It can be readily attached to other engines. Either of these is certainly a GREAT advance in perfection of packing, labor, and time-saving operations.

Under Incidents of Office Practice, Dr. Crandal called attention to a case in hand of a patient about sixty-five years old, with worn portions of six scattering lower teeth, on the labial side to the gum; the lingual, left about an eighth of an inch above, healthy and very firm. He asked, what should be done to supply a fixture of the greatest utility? Some said make a plate that would not rest on these teeth; one said build up with gold and Bonwill's crowns and fill the space with a plate; another had had hundreds of similar cases, but never hesitated to let the plate rest on the portions of teeth. Dr. Crandal said he had decided to make a plate and let it rest on these teeth and build up with portions of porcelain teeth, elongating the natural one, or, as he would call it, an extension of them—these attached to the plate with the other portions of the piece. He said an experience in his own mouth had led him to this decision, he having his anterior lower teeth much worn down, and were very sensitive at times. Annoying him much, he had constructed a piece and so fitted teeth on the tops of these, extending their length, and had used them some two years with much satisfaction. He felt for him they were of more utility than to have them built up with gold, considering the inconvenience he would have to submit to in having it done, etc. He said the patient referred to was very good-natured and generous, but for some reason had failed to put money in his purse; and he wished to do for him that which would be of use to him and within his means; thought it was our duty to consider these little points in the interest of those who seek our services.

ABSTRACT OF THE PAPER READ BY DR. G. A. MILLS.

MR. PRESIDENT: At the last meeting of this society our attention was called to a subject of more than minor importance. That the memory may be revived, I repeat the subject: "The Proper Care of the Oral Cavity."

I commend the effort of Dr. Abbott, but the importance of such a subject, in my estimation, is great. I went away from the meeting feeling a keen disappointment that, aside from Dr. Abbott's paper, the subject was left unnoticed. It may be asked why I did not defend such a paper. I am aware that some will object to my defending a subject that to them needs no defense. No one doubts the duty and advisability of a proper care of the oral cavity. Now, if this is so, the larger number in the profession fail to either prove it by their practices, or their lack of requisite knowledge to do it. The neglect in this direction is a crying shame to our calling. I am fully aware of the arguments (if they may be called such) that are offered against the views I have expressed in societies and published in journals, and that have resulted in many letters of commendation of my views—that thoroughness under the earnest desire for requisite knowledge to perform the service could alone prove the *efficiency* of our calling.

To undertake to defend the "easy-go-way" of doing a little here and there, and at the same time convince the people that our mission is to make the teeth salvable, is a thing impossible; but to prove that by putting the oral cavity into a state of health does make the teeth salvable—giving comfort and usefulness to these organs, far beyond anything of former times, gives cheer that the time will come when it will be the general practice, instead of, as it now is, the exception.

I am of the opinion that not a few practitioners are deterred from allying themselves ever to their convictions because of the financial aspect of this question, and I am free to acknowledge this to be the "*bete noire*" of our calling. We labor under great disadvantage because we do not have the generous hand of public favor, as do the callings of divinity, law and medicine. Many a one has had his blood tingle by being ostracised as a *dentist;* and we have not outlived such things and conditions yet, though happily a change is coming; it is not as bad as it was formerly. It will never be wholly changed until our profession is based upon a more liberal education, that has so long characterized these other named professions. It is of no use to disguise the fact that our calling had a humble origin, as surgery did. Surgery, as a profession, stands second to none, and its followers rank the highest in the social scale. The time will certainly come when our branch of the healing art will rank as high. Such hope should inspire all true lovers of our calling to leave nothing undone to that end. I will not report any of my views of what I consider the proper care of the oral cavity—they being obtainable to those who read our journals.

I want to say that my own experience and observation has taught me that to be faithful, as I understand it, has cost me struggles in body, mind and finance, and not yet a very large percentage of appreciation.

I will explain a financial aspect as well as a grossly negligent aspect of our calling. A patient calls and wishes to have a tooth filled. They are seated in the chair; the tooth is indicated by the patient; the operator sets himself to work at once, and prepares the cavity for filling; nothing particular is said of the nature of the operation, so, if it be a simple filling, it is soon completed. The fee is paid, and the patient goes out no more intelligent about the conditions of his teeth and their surroundings than when he entered the office. Another may call for a similar operation, and may go out with no further knowledge than the first had, excepting that he has been informed that several more teeth need attention in a "short time"—this "short time" being probably when a twinge of pain is felt. Bear in mind that the majority of our patients call to have their *teeth* cared for, not in the least comprehending the subject we are considering. To illustrate:

A patent suffering with a tooth with inflammation around it; it is quite loose. A surface investigation satisfies the operator that it is a case of trouble about the socket—cause, tartar. The tooth meets with another kind of Tartar, and out it comes. By way of conversation, the operator says: "You are likely to lose all of your teeth in the same way; it is only a matter of time." Thus enlightend, the patient goes out. A patient calls at another office and wishes a tooth filled. A general glance exhibits the need of much science to do justice to the patient; his attention is called to the fact; he is told that he has had much good work done so far as it goes, but that there are many cavities needing attention. His reply is, "Yes, I suppose so. I have always been told so, and I go every three months and have them looked after." Attention is called to the unhealthy condition of the mouth. Gums badly congested; considerable recession; pus readily pressed from the gums, etc. This is the first time his attention has been called to these facts, but has noticed how easily his gums bleed when brushed, etc. Two or three of his teeth have at times been sore, and wants to know what can be done, and is told to have his mouth placed in complete order, all cavities filled; all deposits removed that are interfering with health of the mouth, and in the end have a clean, sweet mouth, and know the highest value of our services. This patient may accept your reasoning, believing it sound

and intelligent, and not accept the figures of cost for its accomplishment. He asks, "What will it cost?" The reply is, "This service will require anywhere from sixty to seventy-five hours. Suppose we place the charge per hour at the reasonable figure of five dollars. You can easily see something what the aggregate will be." This patient, like vèry many, may accept your prices and teachings as equally reasonable, but many will accept the latter and not the former, believing the prices *above* the general average, when they are in reality on the same basis, or even lower.

Is there no way out of the difficulty? I shall leave it for those who espouse the doctrine of intelligent faithfulness. To the young men I would say, try and solve this problem for yourselves. You must meet these facts face to face, of absolute faithfulness and its just compensation. You must compare and reflect, if you value the experiences of those who go before you, and be assured that for every effort earnestly made toward furthering this great work, the pathway will be much the easier for you.

DISCUSSION.

Dr. O. E. Hill said the paper led them to think (inferentially) that we were rather uncharitable towards each other, which he rather guessed was about the truth; he thought he was himself, and had been that very day. A person had come into his hands having had a good deal of work which he had paid a fabulous price for—the work upon the back was with gold, and the front with gutta-percha, and saving the teeth—but the gold not. All of the latter he had examined were failing. He thought we saw these extreme cases of price, etc., and perhaps, sometimes, bore down rather hard. Said the paper was a good one, with many good suggestions; he believed that the subject which was principally noticed in the paper, "The Proper Care of the Oral Cavity," was not enough considered; certainly the importance of it. He did not himself come up to the appreciation of its value, nor did he charge enough for what he did do. He said very much could be done in assisting nature to a better condition of health in the oral cavity. He paid a high tribute to Dr. Riggs for the part he had taken in this matter; said the credit was due to him that the greater interest had been created in the last decade, and that the *B. D. S.* had cause for gratitude for the kindly interest he had manifested in his visit several years ago, when the infirmary was in active operation, and there demonstrated his skill. He knew that much could be done to improve the disturbed conditions of the gums, that were

so commonly seen, although he had seen cases that had been pronounced cured that were failures.

Dr. C. D. Cook said there was not much known about this disease, although we had had some quite able articles upon the subject. He saw cases where there did not seem any deposits, but a good deal of looseness about the gums and quite a copious discharge. He did not feel so hopeful over these as those where the deposits were.

Dr. Fry said he had a case lately, to which he had applied himself with a great deal of assiduousness, had dressed from day to day with zinc chloride, and pushed it up under the gums with a thin dogwood stick, so that about the sixth day he could see indications of decided improvement, and he hoped, by following it up, and getting away the filthy accumulations, he would get a good degree of firmness and get the teeth into a state of control and usefulness, that had been for a long time associated with discomfort and disease.

Dr. Brockway served a fine collation, that was approved by all present.

An Evening with the Microscope is very instructive and pleasant to those who may enjoy the privileges of such an entertainment. Any subject that may be under investigation can be popularized so as to awaken the liveliest interest in those who may be wholly uninitiated. The meeting that it is the object of this notice to report, was popular in character, and the distinctive feature of interest to our readers was the exhibition of microscopes, which we propose to describe for their benefit. The meeting was held March 30, last, by gentlemen interested in the subject of microscopy, at the rooms of Dr. A. M. Ross, Chicopee. Eleven microscopes were exhibited, three of which were new, and were sent by the makers for exhibition. A stand, styled the "Achme," was sent by J. W. Queen & Co., of Philadelphia. The price of this stand was $25. Two stands were sent by the Bausch & Lomb Optical Co., of Rochester—one styled the "Model," the other the "Investigator." The price of the former, with one eye-piece, was $22; the latter, with one eye-piece, $45. The "Model" is a most beautiful stand—the best for the price in the market. The "Investigator" has every feature of excellence possessed by the highest-priced monocular stands, and at the risk of having our commendation of it construed into a "card" for the makers, we urge dentists and others desiring microscopes to write this firm for catalogues, etc.

The meeting was informal, and was attended by many professional men—physicians, pharmacists and dentists. Prof. Pillsbury, of Springfield, exhibited a large and beautiful collection of mounted botanical objects. Mr. J. D. White, of Chicopee, prepared his large Bulloch binocular microscope with polarizor, to show starch grains, crystals, diatoms, etc. Mr. David Folsom, of Chicopee, a man rarely gifted in entomological science, brought in his best preparations of insect parts. Dr. C. P. Hooker, of Springfield, took charge of specimens relating to general physiological and pathological histology. Dr. Ross showed specimens of tooth structure, teeth in situ, and specimens showing the development of teeth, some of which were of his own preparation, and some contributed by Dr. J. L. Williams, of North Vassalboro, Me. Mr. C. W. Eddy, of Ware, brought his home-made microscope—a fine instrument—a beautiful collection of specimens, and some fine photographs of objects for projection by oxy-calcium light on a screen. The idea of having these meetings is to popularize this comparatively little known instrument of education, the microscope, and it is earnestly hoped that there may be more of such meetings in the near future.

The nineteenth semi-annual meeting of the Merrimac Valley Dental Society will be held at the Parker House, Boston, Mass., Thursday and Friday, May 4 and 5, 1882. It is intended to make this meeting one of unusual interest.

Per Order Executive Committee,

ALBION M. DUDLEY, Secretary.

THE CONNECTICUT VALLEY DENTAL SOCIETY will hold its semi-annual meeting at Amherst, Mass., June 29 and 30, 1882. The various Section Committees are arranging most interesting reports. An essay by Dr. J. L. Williams, of North Vassalboro, Me., is promised, entitled "Studies in the Pathological Histology of the Teeth and Contiguous Parts." This paper to be illustrated by a stereopticon. Arrangments are perfecting for the exhibition of a few microscopes.

Per order of Executive Committee,

A. M. ROSS, Secretary.

The thirty-third annual meeting of the American Medical Association will be held at St. Paul, Minnesota, commencing Tuesday, June 6, and lasting four days. A Section on Dentistry was formed in this Association at it its last meeting, and medically educated dentists were recognized as specialists in medical science. All medical men of the regular school, practicing the specialty of dental surgery, are most cordially invited to procure credentials from their local medical societies, and join us at St. Paul. All railroads furnish reduced rates to all those members who wish to attend. "A member desiring to read a paper before any Section should forward the paper, or its title and length (not to exceed twenty minutes in reading), to the Chairman of the Committee of Arrangements, at least one month before the meeting." (By-laws.)

TRUMAN W. BROPHY,
Sec. Section on Dentistry, Am. Med. As.

REVIEW OF THE REPORT OF THE BROOKLYN DENTAL SOCIETY IN THE MARCH (1882) DENTAL JAIRUS.

Personally, I am pleased to see the Brooklyn Dental Society reported. I believe in gathering the *golden* grains that drip from the lips of those who think both theoretically and practically. No body of men in our calling can associate together and discuss subjects allied to their calling but what there will be a product worth gleaning, and which will become, according to taste and need, food for the hungry ones. Yet many things come up in these bodies wholly irrelevant, and they, too, often get into the journals at the expense of valuable matter left out. This is noticeable in this report of the *B. D. S.* The subject before the meeting was interesting, and many outside, who are interested, are waiting and watching for instruction upon a subject so allied to indefinite perplexities. In this discussion, *slow movement was pitted against the rapid.* The report shows that a partisan spirit controlled the one who made it, or else the reporter had not brains enough to see the point made or designed to be made.

It will be seen that Dr. Hill criticises Dr. Atkinson, by saying that he "*deprecated decidedly*" his remarks, that "*they were irrelevant*" and "*all wrong.*" Now what does the reader know by this report of Dr. A.'s remarks? Anything from what Dr. Hill says? The inference is, from what is said a little further on, that Dr. Hill has used both

devices, and characterized Dr. A.'s as "*nonsensical*," etc.; and that *he* "had used one of Dr. F.'s devices, and accomplished *what could not have been done by any other plan.*" Well, now who appears in this discussion as more *nonsensical* than does Dr. Hill?

The reporter places Dr. Hill in an unpleasant position, for no intelligent or fair-minded man is going to form any conclusion from such a report as that. Some will pertinently ask, "Why is it that Dr. A.'s remarks do not appear in the report, so that one may sum up the whole intelligently?" Particularly those who do not know Dr. H.'s *real ability*, and who do know about Dr. A.'s, might hesitate about accepting the former's conclusions. Please notice what seems to be the *reporter's* remarks, near the top of page 79:

"Dr. Atkinson, in his usual demonstrative style, etc." Read on, until Dr. Jarvie's remarks come in: How does such a report strike a sensible man? My first impression was, that the report was by a dentist, but, on second thought, I said no *dentist* would use such *terms*. I think some fellow got in without a card, and it may pass on its merits as valueless.

If the profession as a whole could look into 41 East 9th street, and feel the spirit of him, who, never faltering, never relaxing in his purpose day nor night, and who has never failed to respond to the pull of the latch-string, they would see that his constancy has not ended in results to be characterized as they are in this report under criticism in the Jairus. In the closing remarks by Dr. Farrar, "*he* agreed with Dr. Hill in the irrelevancy of Dr. A.'s histological remarks." Very likely, but why did not the reporter give Dr. A.'s remarks? Histology happens to be an important factor these days, and not a little energy is being displayed to get hold of the latest and best on this subject. Evidently principles were discussed by Dr. A., but the reporter cut them.

This review will apply to very many of the society reports given in our journals, and, for the sake of progress as well as of truth, let us have them in a less *garbled* form.

The *B. D. S.* is a society of some self-respect, and it is due all such societies that the reports of their proceedings be just.

REVIEWER.

Chemical Facts Hints and Queries.

Will the New England Journal please tell us what "*Iodoform*" is, and what its supposed therapeutical effect? TWITCHELL.

Iodoform (CHI_3) is the substance formed, when iodine acts on common alcohol in presence of an alkali, like caustic or carbonate of soda, etc. Many other substances, treated thus, give iodoform. It contains in 100 parts:

Iodine, 96.6;
Carbon, 3.1;
Hydrogen, 0.3.

It crystallizes in yellow scales, easily soluble in alcohol and ether, but almost insoluble in water. At 120 degress C., (248 degrees F.), it melts and is decomposed at higher temperatures. In its action it works like iodine freed from its obnoxious properties; it is a caustic of low but continued intensity, hence admirable for chronic ulcers, like decaying teeth, etc. Its little solubility in water prevent its being rapidly carried into the circulation before its local effects have been experienced.

BIBLIOGRAPHICAL.

The *New England Medical Monthly* is a very fine monthly, clearly gotten up and standing on scientific grounds. Our readers will see by the number of selections we give in this number from its columns, that it is full of fine reading matter, just as interesting for dentists as for oculists and other special doctors.

Quiz-Questions. Course on Dental Pathology, Philadelphia Dental College. Prof. J. Foster Flagg, D. D. S. Answered by William C. Foulks, D. D. S., President of the Quiz Association of the Philadelphia Dental College, Philadelphia. George A. Fowler & Co., 2228 Ridge Avenue, 1882. This is the title-page of a small book of very extensive contents. The cover is neatly pressed and the questions in the book are quite sensible. We will give a selection of pathological quiz-answers in one of our next numbers.

Manual of Dental Surgery and Pathology, by Alfred Coleman, L. R. C. P., revised and adapted by Thos. C. Stellwagen, M. A., M. D., D. D. S., published at Philadelphia by Henry C. Lea & Son & Co., is a fine volume, but our space for this number is already taken up, so we better give it large room in our next one.

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ORIGINAL COMMUNICATIONS.

THE RARE METALS AND THEIR POSSIBLE USE FOR DENTISTS.

A paper read before the Connecticut Valley Association, November, 1881, at Springfield, Mass.

BY CHAS. MAYR.*

As you all know, there has been made a distinction between common elements and rare elements, for no other reason than convenience in teaching and studying. If we reflect that the so-called common elements number about twenty-five to thirty, that each element has at least five characteristic physical properties, that it forms at least ten binary compounds, that is, compounds by two with at least four distinct properties of each. that with each of the six or seven common acids it forms peculiar compounds, each of which is characterized by at least four distinct little facts, we see that the chemistry of the thirty most common elements is based upon the knowledge, the understanding and the distinction of at least three thousand little facts, and that a chemist of good standing probably knows some five thousand facts above them : you will understand

*Published at the request of the Society.

why so seldom, even in good schools, the rare metals are made a subject of studies and experiments. Their scarcity, furthermore, makes experiments very expensive. Then, organic chemistry claims its share of a chemist's brains, and a great one too, for the formula of indigo alone would require the knowledge of six facts to be remembered safely; it can be said of the chemical element carbon, that its compounds alone occupy more space in the chemical literature than all the rest of the elements together. But this probably is due to the fact of their common occurrence in nature. There is no doubt to a chemist that there are few elements whose compounds would have to be numbered only by the hundred thousands; and if we take combinations only of constitutions as complicated as urea, without repetitions of the combinations, we obtain at least 48.000,000 compounds. As the number of compounds found so far, prepared pure and analyzed, is, taking a high estimate, about 20,000, you see that our science is boundless, and that we have only commenced to study it. Our chemistry of to-day is to the ideal not yet what the hollow tree-boat of the natives of Australia is to our ocean steamer.

I give these remarks, which perhaps might interest you from the point of view of pure knowledge, a point of view that I consider the highest imaginable, in comparison with which all illusions, air-castles and dreams, of all creeds together, are dust which a hurricane sweeps to and fro and drifts about in all directions, but also to show you that you have little scientific foundation to blame me. if I do not give you here a firework of new, dazzling facts about these rare elements, which to investigate, the pillars of the science, Berzelius, Klaproth, Bertholet, Davy. Guy Lussac, Liebig, Gladstone, etc., spent but little time and work, and which are still ready for investigation.

How relative the term rare is may be seen in comparing nitrogen and silver. Nitrogen forms four-fifths of our air, hence seems to be most common; silver seems to be rare, yet nitrogen being put on one pair of scales and all the silver on the other, nitrogen would weigh 9,000.000,000 tons, silver, 8,000.000,000 tons, on all the crust of the earth, figures of which we have no idea. Compared with this, gold is probably in the crust of our earth to the amount of not less than 8,000.000 tons, while platinum probably does not come up to one million tons. More rare are some other metals, like ruthenium and rhodium, which may not amount to 5,000 tons on the whole earth, and elements like thorium, or cerium, or lanthanium are probably not in quantities of more than 1,000 tons present, while all the chemical

establishments together do not possess ten pounds of each. Of elements as rare as these, we, therefore, can never expect any other but a scientific use.

I shall limit myself in what I have to say to elements that may be procured in useful quantities at a reasonable price. Dentists use metals and their compounds in different directions: for their tools, for metallic fillings, for plastic fillings, for tooth plates, and for physiological effects on the growth of the teeth. For tools, I do not expect that any metal will come into very general use among these rare metals, if not iridium, on account of its very great hardness can be used as the working point of small drills, just as it is used at present on gold pens to form the tips; the hardness of iridium is almost as great as that of emery; it cuts very easily hard steel; also small grinding wheels might be made of this material.

To understand the possible use of some of the elements in amalgams, I will give some facts as to their deportment with mercury: Antimony, as a powder, amalgamates easily and gives white and brittle amalgams. But the use of antimony in amalgams is very objectionable on account of its physiological effects. Cadmium forms easy combinations with mercury; they are crystalline, and heavier than pure mercury; the maximum is 78 mercury to 22 cadmium. It acts in amalgams physically similar to tin. Amalgams containing cadmium will turn yellow from a compound of oxide of cadmium with sulphide of cadmium; the sulphide is bright yellow; the oxy-sulphide has a paler color. If common amalgams, chiefly containing tin, silver, etc., are enacted upon in the mouth, generally insoluble compounds are obtained. Silver sulphurizes and forms insoluble SA_{g2}. Tin forms tin oxide, tin sulphide, tin hydrate, all of which are insoluble; different with cadmium, arsenic and zinc in amalgams; besides the mechanical difference, we have physiological effects from the solubility of the compounds formed; the least injurious effect is that of zinc, a slight local irritant which does not kill the tissue even in relatively strong solutions. Arsenic quickly kills the tissue with which it comes in contact; similar with cadmium, its action is between that of zinc and that of arsenic as it is also in some of its compounds; it is not quite as violent as arsenic, but enough to destroy in time the life of a tooth. The insoluble sulphide of cadmium probably does not form directly, but by decomposition of a previously formed either tartarate or hydrate or malate of cadmium with substances containing decomposing albuminous bodies, yielding sulphur

compounds. Nickel and cobalt can be brought into amalgams relatively easily; they show no useful peculiarities as far as known at present; the amount of nickel and cobalt that can be combined with mercury without any other metal is small, and the amalgam remains fluid, even with two to three per cent. of both metals. Their physiological effects are pretty neutral; large quantities of nickel can be taken without any other but the local effects of an irritant; cobalt is more violent in its action. Bismuthum combines very easily with mercury, the amalgam hardens very slowly and is soft.

When speaking about the physiological effects of certain substances, I have reason to complain about the vagueness of even good writers; e. g., about cadmium, I find a remark of a celebrated chemist—"It is poisonous." What a vague, unscientific term. What is "poisonous?" What does the term mean? Everything is poisonous and nothing is poisonous. Poisonous, like intoxicating, edible, etc., is one of the vast multitude of common life-terms with which, vague as they are in every direction, we only connect certain fanciful ideas. A steak given to a sick child may be as poisonous to that child as one grain of arsenic. One spoonful of alcohol is not intoxicating, and to call alcohol an intoxicating drink seems to me a sly trick by which people attribute to alcohol a property which belongs rather to the individual. That wicked alcohol—those good people! The individual does the intoxicating, not the alcohol; the alcohol is only the means, just as not the bullet shoots the person but the one who misuses the bullet. But back to our amalgams. We may expect improvement of quality of amalgams by the addition of some nickel or palladium or cobalt.

For plate and gum-work I suppose that too little have been tried the alloys of silver and gold with nickel; at least, compounds are known which are as fine a material and perhaps better than pure gold; compounds of gold with antimony are known, nine gold to one antimony, which have the whiteness of porcelain.

According to many experiments which I can confirm, as I once experimented considerably in that direction, antimony forms brittle alloys of no use at present, with copper, zinc, silver; besides, it is easily acted on even in the alloyed state by the acids in food and mouth; the alloys of copper and antimony have a violet color; those of antimony and zinc are as brittle as short dough or dried clay. I have to mention another element which, though it cannot be called rare, is rare in pure state, alumium. When first produced great hopes were based on its lightness, its fine color, its difficult oxydation

and the harmlessness of its compounds. Few of the hopes have been realized. The drawbacks are numerous; the price has been kept too high; still to-day alumium is quoted as high as silver; it costs so much to make it that it cannot be sold for less than it is at present. Its lightness comes little into play for gum-work, where it is loaded with blocks of teeth and gums; it is very difficult to solder. When I was a student at Prof. Liebig I learned a method of soldering alumium; as solder pure tin or an alloy of tin with a little silver is best; lead—which is in common solder—should be avoided because alumium will not take it; also zinc and copper are objectionable; as soldering liquid, syrupy phosphoric acid is best; it solders under these conditions, though with considerable difficulty. The resistance of alumium to dissolving fluids has been found not to be quite as great as at first supposed. If pure, it will resist pretty well, but if containing iron, it will dissolve more readily than any metal used in dentistry. Besides, the compounds formed are not quite as harmless as first supposed. Which compounds do form? If water, containing salt, be boiled with alumium, the water slowly is decomposed with disengagement of hydrogen and the formation of alumium-hydrate; the same process takes place in the cold, only more slowly still. Alumium hydrate is practically insoluble for itself in water, but soluble in tartaric, malic and acetic acid; we therefore obtain compounds of alumium with these organic acids which are always present abundantly in our food. At first all compounds act as astringents, that is, they cause the superficial fibers of protoplasma to contract, but if the administration of alumium be continued the effects are relaxation and soft swelling of the tissues, which can only be removed by the action of proper remedies. I therefore should not consider plates of pure alumium a very favorable introduction. Much better might work alloys of alumium, silver and tin.

Of some use might further prove compounds with wolframium—or Tungsten; it gives great hardness to the different alloys, and for certain purposes this might be useful.

There remains something to be said about the plastic fillings. No doubt, many combinations still await the practical dentist, which will prove useful one way or other, but the physiological effects of most of the rarer metals are too injurious to allow us to expect any great use of them; besides, they mostly form colored compounds. Only antimony, cadmium and bismuthum would form colorless or white masses, but the sulphur of decaying substances would stain bismuthum

compounds black, cadmium compounds yellow. There is no blackening from the sulphur from normal albumen, only decomposing albumen blackens silver, copper, lead, etc. Albumen contains a varying percentage of sulphur — Egg albumen, 1.6; Blood albumen, 1.2; Fibrine, 1.2; Muscle fibrin, 1.1; Caseine, 1.0; Legumine, .9; Caseine (almonds), .3; Emulsin, 1.2. The sulphur in these compounds, as long time as they are parts of living organisms, is not separable by the common weak reagents for sulphur or sulphuric acid or sulphuretted hydrogen; only when decomposition has set in, the sulphuretted hydrogen is disengaged. This is of importance in filling teeth. If we find under an amalgam-filling a heavy black deposit of sulphide, decomposition has been going on; if, on the contrary, the filling is only coated with a whitish or brownish layer, the tissue remained relatively healthy. A gold filling, of course, would not show this difference, since it forms no sulphides, but the processes described nevertheless go on.

In connection with considering the advantages of the rarer metals, it might be asked if perhaps there might be an agent among them to "bleach teeth." Bleaching is as such no chemical term. We might put the question: Are we able to destroy the coloration? What is it? That is to be answered first, ere we can go for it. But just here we meet with the most different views possible. From carbon down to sulphide of iron I have already read every view possible. The one who says in the Ohio Monthly that he considers the tooth a mass of lime with a little organic substance, regards it as pure carbon. With him we will not deal any longer. If the tooth is nothing but a mass of lime with a little organic substance, it will be very easy to study and make teeth. We first make them by drying a mixture of albumen and chalk and phosphate of lime and then let concentrated sulphuric acid act on it, and we have black decay. Concentrated hydrochloric acid produces white decay, etc.! Is it possible that in our century such crude—horribly crude—ideas can only be thought of. Because sulphuric acid blackens organic substances, these men suppose an acid like sulphuric acid acting in the tooth turning it black; because hydrochloric and sulphuric acids dissolve lime they are taken into the theories to account for the decay. Gentlemen, this is no science! A decaying tooth is to us, and to every thinking chemist, still an "I do not know." We do not know what dissolves the lime or why it dissolves only on this spot and not at others. The best we can do is to make a supposition as well supported as possible by the

best knowledge. First, the coloring of teeth comes from within; we need not suppose that blood corpuscles pass the capillaries of a tooth; the serum itself becomes colored under certain circumstances in contact with air. All attempts to bleach teeth must, therefore, strike the nutrition; we must bring back into circulation the colored deposited lime and connective tissue; but just in proportion as our knowledge of the cause grows, you will see that every attempt to bleach the tooth from without must fail. The best bleaching agent for very superficial action from without, without injuring the tooth, might be hydrogen peroxide, a rare substance, prepared only with difficulty, which cannot be kept for itself for any length of time. By treating a tooth from time to time with this substance it probably might be kept at an acceptable shade; it does not form an acid nor does it contain any; is entirely colorless and, in decomposing, produces nothing but water and with the carbon of tissues carbonic acid, deriving the carbon from organic substances it comes in contact with. But until we have found something which injected near the tooth into the tissue will alter the circulation so that the latter carries away the colored deposits, we cannot hope, radically, to cure coloration.

It might be asked further if there might not be found some anæsthetic which might act locally without affecting the whole system. It looks indeed rather coarse business, if we have to render insensible a whole living mass of 150 pounds weight, of millions of ganglia and nerve threads, simply to include into this general insensibility a small microscopic fiber ending at a small piece of inorganic substance. It is stopping a train to brush off a little stone from one of the wheels. With all local anæsthetics we have to consider the danger of destroying this small twig, and that is what limits our activity. Besides, the pain is probably at a point where we cannot reach the nerve. If we have caries, not the black parts in the cavity are painful, but the inflamed nerve at the narrow opening of the root sends the telegrams of his distress to the powerless brain — dead nerves do not tell stories as little as dead men. The best local anæsthetic is arsenic, but unfortunately its use is too dangerous to be recommended. Carbolic acid is too superficial, as are all these harmless compounds, Naboli, etc., strong alcohol. My personal conviction is that there will not be found so very soon a safe local anæsthetic for teeth. All the local anæsthetics on other parts, cold, electricity, etc., cannot be used with teeth because they are worse than the thing we want to remedy. The practical dentist alone can here decide what is best.

One has a good power of persuasion. He will talk that it does not hurt, until you believe it. The other tells white lies about the pleasing sensation of forceps, drills, and nerve needles, and when he is in your mouth it is too late to stop his "fiendishness." The best anæsthetics are time and self-control.

Perhaps the weakness of my paper in physiological facts will induce one or the other of you, who have more time and opportunity than I, to make experiments as to the physiological effects of some rare elements. I have no doubt that much good may be expected from compounds of Thorium, Thallium, Palladium, and many others in physiological directions.

A PECULIAR CASE OF INHERITED HEMORRHAGIC DIATHESIS.

BY DR. C. T. STOCKWELL, SPRINGFIELD, MASS.

Quite frequently, during the past seven or eight years, I have been called upon to perform dental operations for a gentleman of this city, who is the unfortunate subject of a hemorrhagic diathesis, so peculiar in its nature that a record of the same seems to be not unimportant. And among the many interesting facts connected with the case, that feature of it which demonstrates the persistent, tenacious force of inherited tendencies, is not the least. He is a descendant of a family whose history—much of it well known to me—shows a remarkable manifestation and transmission, by some of its members, of an anomalous physical organization, subjecting the person so constituted to an extreme *liability* to bleed profusely upon the occasion of even a very slight wound; a simple bruise, scratch, or biting of the tongue, has been known to be sufficient to originate a characteristic hemorrhage. Hence, they have been called, for many generations past, "Bleeders."

This phenomenon may be briefly described as follows: A cut, or other injury, be it simple or severe, assumes at first the common appearance. Soon, however, if inclined to bleed, a cone of coagulated blood gradually forms upon the rupture. This cone has a minute aperture, and is large or small, according to the severity of the wound. After a week or more, as the case may be, the blood begins and continues to flow from the aperture in the cone in a stream, perhaps, but usually more moderately, sometimes for several days in succession, until that fluid becomes nearly as colorless as water. At this stage, the sufferer of course assumes a most ghastly appearance, and is fre-

quently unable to raise a hand or even a finger. At least in two instances my patient has passed into a state of complete unconsciousness, the red corpuscles having become exhausted so that the slowly oozing hemorrhage would scarcely stain even the whitest cloth; and, strange enough, just at that critical point, the bleeding ceased, and he came rapidly back to life. He told me once that he "had died twice, and been resurrected." In one of these instances, the occasion of it was a simple rupture of the skin on the side of the neck, and the other a tongue-bite. In many other instances, more severe injuries have not reached such extremes.

The history of this man is the history of the whole race, and the nature, character and course of the phenomenon is common to all as far back as it can be traced. The bleeding ceases when the cone, which becomes very fetid, falls or sloughs off; a patient surviving this point usually recovers very rapidly. It has been found practically useless to attempt to stop the flow of blood at the cone. If one cone is removed, another forms. They also often bleed profusely at the nose. At least two physicians are now known to have belonged to this race of "Bleeders," both of whom died from excessive hemorrhage from trivial causes; and in no instance, of which I can learn, has this trouble seemed to yield to any treatment. About all that is attempted by way of treatment is to keep up the strength by highly nourishing and blood-making food, so that nature may be supported until she can slough off the cone, when the hemorrhage invariably ceases.

My patient is a sufferer from "Riggs'" disease of the gums, but what can I do? It was too far advanced, when he came into my hands, to accomplish anything without thorough work, and that I preferred to be excused from attempting under the circumstances. Consequently, his gums are gradually wasting away, and the teeth becoming loose and troublesome. For weeks and months I have seen one or more in a condition that they could be easily removed with the fingers alone; and, even then, in one case, when the tooth finally dropped from the gums, a cone (the sure precursor of bleeding) soon appeared and a hemorrhage followed, by which he was much exhausted and sorely troubled. In this case, the cone of coagulated blood nearly filled his mouth at times, rendering it almost impossible to take food. The fetor was also extremely offensive. I might cite many other instances that have occurred with this gentleman and his immediate progenitors, but as the description of one case illustrates all, except in degree, it would seem to be a work of supererogation.

There is, however, one other feature which must not be omitted, that shows the hereditary peculiarity of the phenomenon. It has been traced back through several generations to a single family in Ipswich, Mass., who introduced it here from England, and in all its history its course is the same. None but *males* are bleeders, and the sons of bleeders are *never* subject to it; but a bleeder's daughter's and sister's sons are extremely liable to be so predisposed. Bleeder's granddaughters' sons, on the mother's side, are also *liable* to be affected, but the number of progenitors, however, who thus resemble their grandfathers, is comparatively small. Bleeder's sons' sons are never troubled in this way. The descent is by the daughters and sisters of bleeders, and manifests itself only on the *male* side. It is said, furthermore, that those who are in that line of descent where they would be supposed to be *liable* to this malady, but are *not* bleeders, are found to manifest, instead, a predisposition to "quick consumption," or what is called "consumption of the blood." How uniformly true this may be, I am unable to say.

As far as I can learn, science and skill have been alike baffled in the elucidation and treatment of this strange phenomenon.

GOSSIP.

BY W. H. ROBINSON, D. D. S., OAKLAND, CAL.

"Young man, go West," is an admonition which has been quite generally obeyed. Yesterday we had a friendly call from Dr. Porter, of Toledo, O. "How do you like California?" we asked. Of course he liked California on general principles; everybody does. We have the best climate of the continent. Our next was "How about dentists in California?" His answer was, "You have more dentists to the population than any State in the Union, counting your 140,000 Chinamen who have no dentistry done." We think Dr. Porter was correct. California is the jumping-off place. When you touch the Pacific shore you cannot go farther West. The next place is China, and that is in the East. Our climate is salubrious, enjoyable, magnificent. Over about a third of our State there is nothing but climate, and those who try living there say a man does not get fat on climate alone. As a steady diet, pork and beans are better.

Well, as a result of our fine climate, people like to live here. Dentists and doctors like to live here. Consequently, we get our share of

those who could live in the East and two or three times our share of those whom ill health drives from the East. In one nice little town on our coast, with about 3,000 inhabitants, there are from seven to nine doctors who came there for climate. Now, these doctors are nice men, but they are human, and for a steady income must have something more tangible than climate, so they practice their profession. They cannot choose, like healthy men, a location that will give them the best business. Health is first. A thousand dollars a year and a climate that they can live in is preferred to a $5,000 practice in the frigid climate of the East. Here we have a clear contradiction of Darwin's pet axiom: "The survival of the fittest." We have the survival of the sickest in California, that is, the healthy, who can live anywhere, go where business is best, and the sick stay here. We are not finding fault with the unfortunate professional men of the East who are compelled to come here or die. We are glad so many of them can live here and do some business. But we want to say to the New England doctors and dentists, if you are healthy, stay where you are till you get rich, and then come to California. This is the best place outside of heaven for rich men. It is not the best for poor men. One thing is certain, M. D.s and D. D. S.s are greatly in excess of the needs of the population. In 1874 we were in Quincy, Illinois. It was a city with about the population of Oakland, and five to ten times the business. Quincy had six or seven dentists, Oakland has twenty-six or thirty, and at least one-third of the people of Oakland have their dentistry done in San Francisco. Allowing for those who cross the ferry to have their dentistry done, Oakland has one dentist to every 1,000 inhabitants. San Francisco has from 140 to 150 dentists. Omitting her Chinese population, who have no dentistry to speak of done, leaves one dentist to every 1,500 people. The majority of the voters in San Francisco are foreigners. Foreigners on an average have much less dentistry done than natives, and this is specially true of the *extremely foreign foreigners* that are so numerous in that city, and yet we are told the accessions of Eastern dentists to the fraternity of San Francisco average fifteen to twenty per year. What is true of these two cities is true of the whole State. S—— County, with no large city, and a population of 16,000, has ten to twelve dentists. We have no law in California restricting any one who chooses to practice dentistry, and just as fast as the Eastern States secure legislation that shuts out the frauds and quacks, they naturally seek a more congenial clime. California is not lacking in her

home supply of this class, but, alas! in addition to her home production, she has to receive a large supply that rigid laws or frigid climate drives from the East. We are a generous people here. California is the best state in the Union for a man to live in on twice his income.

Take the average genuine California dentist, and he is on a full par with those of any Eastern state. Gold has been more generally used here in filling than in the East, and California incisors and molars glisten and sparkle with gold restorations that exhibit the highest artistic taste and manipulative dexterity. We do not even bow to "*Bosting*" in cunning contours. There is a common impression in the East that dental fees are very high on this West coast. Of course, operators of established reputation in all large cities command almost any fee they choose. Then, of course, we have an abundance of that class that take any fee they can get; but, as far as we have data to guide us, we believe the charges of the first-class dentists of San Francisco are considerably below the fees of the same class of dentists in the big cities of the East. Through our rural towns the prices are considerably higher than in the East, and yet we have cheap Johns every where, who advertise fillings, fifty cents and upwards, and plates five dollars and upwards. We have plenty of room for all who come to California. We want to give the numerous M. D.s and D. D. S.s of the East this advice: Come to California—by all means, come. But stay a few years in the East and make some money before you come You can do it easier there than you can here.

> "There was a man in the East
> Too lazy to work, but he liked to feast;
> So he concluded it would be best
> To pack up his traps and go West,
> Where he could so easily feather his nest.
> But the trees of the West were not laden with gold,
> And things were not as he had been told;
> So he went East rather badly sold."

MORAL.

> "There is no Western road to wealth and Heaven;
> These only to those who earn them are given."

When a lady remarked to Dr. J. T. Codman the other day that she had heard teeth called "dew drops," it was of course just like him to reply that "they *do drop*, sometimes."

SELECTIONS AND ABSTRACTS.

THE DEVELOPMENT OF THE SENSES.

BY ROBERT W. LOVETT.

In the fifth century before Christ, Democritus declared that the senses of sight, hearing, smell, and taste were merely modifications of the sense of touch. Aristotle ridiculed his theory, and so, stamped with his disapproval, it lay untouched for two thousand years, until Telesius, an Italian of the sixteenth century, revived it.

Strange to say, all that modern science has accomplished in embryology and zoölogy tends to confirm this theory of Democritus, that these four senses are only specializations of the universal sense—the sense of touch. In the embryo of all animals the organs of these four senses first appear as infoldings of the outer germinal layer, the ectoderm, from which the outer skin also develops. At an early stage they are all simple pockets in the outer covering. If the history of the embryo is to be taken as the miniature of the history of the race—that is, if the individual in its development follows the same course that the race has followed, and it seems reasonable to suppose that this is the case—it is easy to see the importance of this evidence.

In the animal kingdom the sense of touch is universal; it is even found in those lowest animals, the protozoa, which are only masses of simple protoplasm. But, if this animal with its one sense is to become higher, there must be a division of labor; there is too much work for one sense to do properly, and by a quantitative modification this primitive sense is to become qualitatively different in parts, and this qualitative difference is the difference which we notice between the sense of touch and the other senses of the higher animals; it has come about by an accumulation of the sense of touch.

The waves of air which fall on the body of this protozoan as heat are capable of a higher rendering, they will signify more than heat to the proper organ for perceiving them, they will give the sensations of light and colors. The simplest eyes are merely pigment-spots in the skin, they merely distinguish heat from cold and light from darkness; but later, by the formation of a lens and sensitive membrane, the external world is revealed in all its variety.

The eye is first found in the sea-anemone, where it is merely one of these pigment-spots. But all that the most complete eye can give

to us is a field of gradated colors. In itself this field of colors conveys no information to us. It must be explained before it can be of any practical use to us, and this necessary explanation can only be furnished by our sense of touch. That is, distance, magnitude, and shape are not directly perceived by the eye, but are suggested by certain objective gradations of color which have been associated with them in our past experience. Thus, sight appears as entirely dependent upon touch for its usefulness. This theory was first advanced by Bishop Berkeley in his famous "Essay toward a New Theory of Vision," and was afterward confirmed in a very wonderful way by some experiments made by Dr. Cheselden, of London. A young man had been blind from his birth on account of cataracts. These were removed by Dr. Cheselden, and he suddenly received his sight. At first he could perceive no such thing as distance or form. Only by repeatedly touching objects could he bring himself to realize that certain experiences of touch were always associated with certain gradations of color. Gradually he connected the sensations of sight with the sensations of touch, and in time became as insensible as we are to their true relation.

The ear first appears, in the jelly-fish, as a pocket in the outer skin. In this simple condition it serves as a general indicator of violent air-motion. But as the animal becomes higher there is a demand for a nicer perception of sound, and this pocket is closed and finally is provided with a complicated acoustic apparatus, in the same way that the eye is provided with a lens, which renders into terms of noise and music those air-waves which to the rest of the skin are imperceptible.

But a sound conveys no more information in itself than does the field of colors presented by the eye; only when we can tell from what it comes, and what consequences have been connected with it in our past experience, does it have any practical meaning to us. And, again, this explanation can only be furnished by our sense of touch, or by our sense of sight, which, as we have seen, is entirely dependent upon our sense of touch.

The senses of smell and taste should properly be resolved into one sense, for they are probably only late modifications of the same property of the mucous membrane lining the mouth and nose. This membrane is only an invading growth of the skin surrounding the mouth, so, morphologically, this sense is the same as the two just examined. The sense of smell is undoubtedly present in some insects, as, for instance, in the burying beetles, and may perhaps be found lower.

In man this double sense is undoubtedly retrogressive, and probably reaches its highest development in some of the lower mammalia. With us it is at best only a source of transitory pleasure, and seems in no way to contribute to our higher mental development.

But the senses of sight and hearing are very different in this respect. If Darwin is right, they have played a most important part in the evolution of the past as the instruments of sexual selection. And, in the future development of our race, it seems as if their perfection would be reached only with the perfection of the human mind. For if the impulse to development is given from without by the environment, these organs must be continually improved so as to perceive the nicer and nicer distinctions in the environment which will be the means of elevating the mind. If the impulse to development is given from within the mind, these sense-organs must be developed more highly in order to provide the enlarging mind with the continually nicer perception which it will require.

Man's mind develops, not his body. With the exception of these two sense-organs, his body has been nearly stationary for thousands of years, but these two organs respond to comparatively little change. The ear of the savage differs from the ear of the civilized man more than the two men differ in any other respect.

Touch, smell, and taste seem as complete as they need be for any conceivable human being, but that the eye is yet incomplete is very strikingly shown by the so-called actinic rays of the solar spectrum. In this spectrum there are rays beyond the violet which have an action on certain chemical substances much like the action of the blue and violet rays. But to the human eye these rays are absolutely invisible. The perception of this unknown color seems but a short step in the development of the eye.

But how different from the others, both in character and history, is the sense of touch! Having with them a common origin, like them it is resident in the outer skin, but it is active alike all over the body; the touch of the finger-tips may be more delicate than that of the palms, but it is only a quantitative difference. The sense of touch is the fundamental sense. All the other senses have to render their data into its terms before they can be understood by the mind. Animals can live without sight, hearing, taste, or smell, but the presence of the sense of touch seems a necessary condition of animal existence. The other senses are means of self-preservation; the sense of touch is the manifestation of an animal's existence.

The senses, then, all originate from the outer covering; this covering has from the beginning a special sensation from the resistance to external pressure; this property it retains throughout the animal kingdom. The other sense-organs appear as specialized parts of this universal sense-organ; morphologically they are only parts of the skin, rendered more sensitive than the normal skin.

All the evidence seems to point one way, to the conclusion that the other senses are all modifications of the sense of touch. That such is probably the fact seems to be generally admitted. What I have tried to show is our ground for that conclusion, and that what was with Democritus a random speculation is with us fast assuming the nature of a scientific truth.—*Popular Science Monthly.*

MALARIAL ORGANISMS.

M. A. Laveran has found in the blood of persons suffering from malarial poisoning parasitic organisms very definite in form and most remarkable in character; motionless, cylindrical curved bodies, transparent and of delicate outlines, curved at the extremities; transparent spherical forms provided with fine filaments in rapid movement, which he believes to be animalcules, and spherical or irregular bodies, which appeared to be the "cadaveric" stage of these, all marked with pigment granules. He also detected peculiar conditions in the blood itself. During the year that has passed since he first discovered these elements, M. Laveran has examined the blood in one hundred and ninety-two patients affected with various symptoms of malarial disease, and has found the organisms in one hundred and eighty of them, and he has convinced himself by numerous and repeated observations that they are not found in the blood of persons suffering from diseases that are not of malarial origin. In general, the parasitic bodies were found in the blood only at certain times—a little before and at the moment of accession of the fever, and they rapidly disappeared under the influence of a quinine treatment. The addition of a minute quantity of a dilute solution of sulphate of quinine to a drop of blood sufficed to destroy the organisms. Mr. Laveran believes that the absence of the organisms in most of the cases (only twelve in the whole one hundred and ninety-two) in which he failed to find them was due to the patients having undergone a course of quinine treatment.

—*Pop. Science Monthly.*

EDITORIAL.

Several things conspired to very severely try our patience in regard to the last number. In the first place there was an annoying delay in going to press after the matter was all in, with reference to which we tried to be philosophical and patient, knowing that the removal of a large printing-house is liable to be attended with some internal disturbance and upsetting of the best of calculations; but when the number finally came and we found the *binders* had played the *devil's pie* with the advertising pages, we about lost our grip on patience, at least in any *religious* sense. Had it not been so late in the month, we should have corrected this inexcusable blunder, even had it involved the reprint of the entire edition. Inasmuch as it does not affect the matter of *volume* binding, we finally decided to mail the edition as it is. But after hurrying them off, and having had time to look the number over more carefully, we are again disturbed to a still greater extent, if possible, by discovering a carelessness on the part of the proof-reader (ourselves) that is little less than exasperating.

When the June number is mailed, we trust this "Jumbo" of trinitarian "devils" will be found to have been cast out.

An item of interest, in the field of dental education, appears in the announcement that the University of Maryland has organized a *new dental department*. Prof. F. J. S. Gorgas, for twenty-five years connected with the Baltimore College of Dental Surgery, accepts the position of Dean in the new department; and Prof. Jas. H. Harris, also formerly connected with the Baltimore College, becomes Professor of Clinical Dentistry. The University of Maryland is one of the most venerable medical institutions in the country, and abundantly able to make the "new department" a success, which we trust it may do. All communications in reference to the above should be directed to the Dean, 259 N. Eutaw street, Baltimore, Md.

After being compelled for so long a time to notice in the various public journals, from all parts of the country, the frequent flippant and senseless references to the dental profession, it is refreshing to find now and then an article whose writer seems to possess an approximate

conception of the true status and scope of modern dentistry, or that part of it which represents the progressive and scientific side of the profession that is so rapidly coming to the front. The latest that has come to our notice is an editorial in the May number of *The Paper World*, entitled "American Dental Journalism," and is so good that we copy a portion, omitting much that may be of too personal a nature to ourselves and others. It may be found in another part of this number.

We are sincerely pained to learn that Dr. J. L. Williams, of North Vassalboro, Maine, has quite recently been sorely afflicted by the loss of his wife. The precise date, or circumstances connected with her death we are unable to state, but infer that it was sudden and unlooked for. We are sure that all who *personally* know Dr. Williams, and none the less those who only know him through his able and interesting investigations in the field of histology, as reported in the dental magazines of late, will be deeply sincere in their condolence. Conscious as we are of the fact that the most profound sympathy cannot make good the loss, still, next to the *memory* of the departed, we believe it to be the most helpful in bearing it; and the JOURNAL wishes to join those who offer it in full measure.

RAMBLINGS AMONG THE JOURNALS.

The first article of the *Independent Practitioner*, for March, 1882, is a clinical lecture of Jas. T. Whitaker, M. D., on a case of facial paralysis. For students of the effects of nerve lesions and by conclusion, as to the function of nerves, nothing is better than an exact report of such cases. The case has nothing particular in itself; it is one of rather common paralysis of the so-called portiamollis of the seventh nerve of Bell or the facial nerve, as it is termed now, but it is treated very interestingly.

According to an extract from the Lancet (London), they use in London hospitals *artificial* Hunyadi Janos water. "It will be found to possess every advantage attributed to the natural variety," says the Lancet (London). How does that agree with the view of those clamorers who suppose that the solution of Glauber and Epsom-salts, as it flows from the soil at a Hungarian town, is quite different from the same solution made at any other place, only minus the peculiar labeling and the peculiar bottles?

The editor sees danger ahead in the formation of anti-vivisection societies in America. The anti-vivisection legislation is one of the greatest aberrations to which impressive females may induce masculine (?) legislators. Against cruelty, all states have sufficient laws, but to block scientific investigation for the sake of a few weak-minded males and females who, in their ignorant clamoring, too easily find applause from ignorant masses, would mean to go back one step into mediæval fanaticism, only in other directions. About the value of vivisection there can be no dispute among competent people with sound minds. To exclude vivisection for the physician is the same as to forbid a mechanic to practice filing on a piece of iron, or for a chemist to evaporate several times a solution of alum, in order to get good crystals. Think of that cruelty against the poor alum, to be heated and evaporated several times, only for the sake of getting crystals which one might just as well buy. There is no religious, no rational foundation to the anti-vivisection movement, only the defective logic of the lady secretary of the club in England, together with "society influences,"—that is the influences of an ignorant mass of well-dressed, rich, sentimental fops, with immense assumptions,— are the scientific (?) foundations of this craze.

The *Dental Cosmos* of April, 1882, opens with a continuation of an article by J. Foster Flagg, D.D. S., on dental pathology and therapeutics; "entered according to act of Congress, etc., by J. Foster Flagg, in the office of the Librarian of Congress at Washington." What is entered? The article, or the title, or the Dental Cosmos, or Prof. Flagg himself? In either case, in copying the title, we do not intend any harm and wish to remain unmolested from legal proceedings. We hardly dare criticise on account of that act of Congress. The paper is on replantation in its detailed aspects and is very good in its practical points. We possess Dr. Flagg's quiz-questions and we looked to them for explanation of the "basal attributes" and "controlling attributes," the names sounding to us so very Hindoo. All we find is on page 93, where some fine words for spelling matches are found, but no explanation of what we were looking for. What is "bilious positivity"? Biliousness? Every dictionary accessible to us gives out; there is a number of similar empty words without exact meaning in the article; but the fact that we do not agree in minor points ought not to produce the impression that we do not consider the paper very good.

The second paper is on the assimilation of Inorganic Particles and the Topical Action of Mineral Waters, by James Truman, D. D. S. Most heartily we shake hands with the author on the grounds of the evolu-

tion theory. The terms "coarse" and "gross," used of flora and fauna, are so completely arbitrary and undefinable that we should hesitate exceedingly using them in a scientific essay or paper. There is no more coarseness in an alga than there is in a flower; no more coarseness in an amœba than in the human brain; those terms are made from a stand-point of simple and pure vagueness. A marsupialian animal is in no way "coarser" organized than a cat or a dog. On the point of assimilation of inorganic compounds there might be some doubt, and very grave doubt. To get over the difficulty of the assimilation of lime-salts by hens, the author simply gives us the authoritative statement: "The shells of eggs cannot be held in any sense as organized products." Why, what then? Please to make egg shells, *identical* with those of eggs, in the laboratory. If the author will do that, all right. Close them properly,—get the pores and all that of egg shells, and then we will believe him, but an egg shell is just as much organized as the animal. Again and again "vitality" in all its vagueness appears, while it would be far better to speak what exact action of "vitality" comes into play, instead of a cheap "lack of vitality." The article closes: "An inference to be arrived at from the examinations there given, is that there is no local destructive action by the ordinary waters that are found upon the earth's surface." Such a sentence ought not to be stated in such a general way by a scientist of Dr. Truman's standing. What are "ordinary waters?" Every water is ordinary, and no water is ordinary; every water is peculiar in its composition, and not ordinary. There is the Rio Vinagre, in South America, the Tuscarora water and some springs at Alabama, Genesee County, N. Y., which contain respectively 2-4 p. c. of sulphuric acid. They are just as well "ordinary waters" as the Karlsbad and Ems waters, yet this general statement will not hold good of these waters. Better perhaps would it have been to say that waters of neutral or decided alkaline reaction have no local destructive action.

In an article on the Value of the Dental Pulp, at Different Periods of the Life, by D.D. Smith, D.D.S., M.D., the author makes the following statement: "With the extirpation or death of the pulp not only is all sensation in dentine and enamel at an end, but all vital change." "While it is improper to speak of a pulpless tooth as a 'dead tooth,' it is certainly not inaccurate to characterize the enamel and dentine of such a tooth as 'lifeless or dead.'" The pulp is dead, the enamel is dead, the dentine is dead, and remains only the pericementum to prevent the tooth from being called dead. Is not that what the author means?

In the meeting of the New York Odontological Society, December 20, 1881, the spicules of bones found in the sockets of teeth, and their troubles, formed a chief topic of discussion. The cases where they occur are not many; the symptoms are very dark, in every case the pain was unbearable, and the only relief was extracting an apparently sound tooth.

Operating Table and Laboratory.

During the discussion of the question of "Transplanting and Replanting Teeth," at the late semi-annual meeting of the Merrimack Valley Dental Society, Dr. T. Palmer, of Fitchburg, Mass., related the following: While he was a small boy his father suffered the loss of a tooth—an upper incisor. After returning home and viewing his misfortune by means of a glass, the expression of his face indicated that he did not enjoy the disfigurement. He, however, being a native Yankee, proceeded to carefully study the extracted member and the socket from which it came. Soon he started for the "wood-pile" and selected a piece of pine wood that very closely resembled the tooth removed in color, carefully shaped it so that it exactly compared with the tooth, and again presented himself before the glass and proceeded to press the wooden tooth into position. Finding it a little too long, he withdrew the same and shortened, after which he reinserted firmly, where it did good service for four years. The Dr. says that it was in watching this operation that he first received an impulse to become a dentist.

TRANSPLANTING AND REPLANTING TEETH.

Those having occasion to replant or transplant teeth will find an "item of interest" in regard to retaining them in place by turning to pages 170 and 171 of the Cosmos (current number). In our estimation, it is as absolutely essential that replanted or transplanted teeth should be ligated or in *some way* retained for a suitable length of time in an *immovable* condition, as a broken bone. A tooth so large as to need a mallet to "*send it home*" does not by that treatment take any more kindly to its new relations. In such a case absorption is absolutely sure to take place and the tooth expelled. Understand protoplasma, and then learn to guard and protect it, if you would gain success in this direction.

CHICAGO, May 3, 1882.

Editors of New England Journal of Dentistry:

I notice in the April number some remarks in relation to lining rubber plates with metal. Your correspondent, "E," is correct in saying, "more humbug than common sense." The metal conveys the heat only to the rubber, and there it stops, and the heating process and inflamed membrane still remain. I have found that the process of absorption goes on beneath the rubber attachments of a gold plate the same as though the plate were rubber. The only advantage of the gold is that the heat is not retained over the palate. Any person who can afford metal plates ought to wear them in preference to rubber on the score of healthfulness, cleanliness and comfort, *provided*, of course, the dentist knows how to properly make and adjust the metal plate to the mouth. L. P. HASKELL.

We wish to add a few words to what we said in the last number in commendation of the "Sand-paper Disks." The continued use of this appliance adds to our appreciation of it. Dr. Meriam called attention to an improvement in the matter of "cutters," by Dr. Stevens of Lynn. We have in our possession one of the Stevens Cutters and find it to be all that can be desired. All that any one needs in order to supply himself with these very great helps at the operating table is to procure a cutter, prepare his paper or crocus cloth, and "punch" them out by the hundred. A few minutes' work will supply you for a month at an expense not exceeding two cents per hundred. The Stevens Cutters are made of the best of steel and of four sizes—three of them corresponding with the three smallest sizes of Dr. Meriam's, as illustrated in our last number; the fourth being still smaller, one-half inch in diameter, which is a very convenient size in many cases.

The machinist who makes the cutters for Dr. S. has the dies for forging and tools for milling them, and should any one wish to order them rather than get them made himself, he can send one dollar and five cents to Dr. S. G. Stevens, Lynn, Mass., who will send one all ready for use.

Two sheets of crocus cloth should be glued together, cutting sides out, in order to make a disk stiff enough to be of service. One side may be shellac varnished if desired. Large disks may be easily made smaller by placing them in the mandrel, revolving at a high rate of speed, and by means of a sharp instrument reduce in size somewhat as a wood-turner would proceed with a block of wood. By this means one cutter will answer all purposes.

A dentist was once called upon to treat an abscessed bicuspid, but after frequently pumping in carbolic acid for a month or more, and the discharge, if anything, increasing, was led in sheer despair to fill root and crown—whether with "brains" or not, we cannot say. However, the abscess speedily subsided. What was the condition, and why did cure result? OSCAR.

Evidently the case cited is one of the many "too much treated," and whatever the tooth was *filled* with, "*brains*" did not enter largely into the *treatment*. There may have been a discharge of pus at the beginning, but at the close it was pure *protoplasm*. Nature was doing all she could to make repairs, and won the victory only by manifesting unusual persistence.

Dr. Atkinson has preached many a sermon on this subject, and doubtless many a time been grieved by the dullness of his hearers; but, we believe, some have heard and treasured up his teachings, and cheering results are being manifested. The study of histology and the use of the microscope are the avenues through which a correct knowledge of these cases are obtained, as well as the method of their scientific treatment.

Carbolic acid is excellent in its proper place, but it is not always indicated, and when this is a question, mild dressings may be resorted to till it is certain that a more powerful mendicament is required. Dr. Flagg used to say to his class, "when you don't know what to do, do nothing," and it cannot be denied that this is good advice; but it is much better to know what to do and go ahead, the *master* rather than the *slave* of circumstances.

PIVOT CROWNS.

The great variety of cases and conditions met with in the practice of dentistry make it necessary for the operator to be well up in methods, if he would serve his patients worthily—not one base plate for every set of teeth, not one kind of filling for all decayed teeth, or one method of attaching crowns to the roots of teeth, but each in its proper place. For the last-named, there have been various methods described of late, and all very likely have some merit. There is, however, a method employed by a few of the old operators which has the merit of having been proved successful, and is especially appli-

cable in those cases where the root to be operated upon stands more or less out of position.

Prepare the end of the root as usual. If the canal is quite small, enlarge it only to the size of the gold or other wire desired for the pivot. Fit over the end of the root, by burnishing and trimming, a cap of platina or pure gold; punch a hole for the pivot over the hole in the root, and solder pivot in place. With this in position, grind the (plate tooth) crown to place (of course it can be placed in any position necessary, and this is one great advantage of this method), retain with wax or by other means, remove, imbed in plaster and sand, and solder. Next enlarge the opening in the root to about the size of that in an ordinary pivot crown; drill a hole in a piece of ivory or bone (an old tooth-brush handle will answer) the least possible smaller than that in the root; make a hard wood peg of such a size that it will be somewhat condensed on forcing it into the hole in the ivory; cut off each end smooth with the ivory and drill through the *center* of the peg a hole of such size that the gold pivot will enter with comparative ease. This *bush* is to be removed and placed in the root, the gold pivot barbed and forced to place.

If the root canal is much enlarged, prepare thoroughly and fill with amalgam, using a portion of the tapering end of a common needle for a center hole. Remove the needle at once, and when the amalgam is hard, proceed as with a perfect root.

Hide your fillings. Don't let them proclaim to the world "this tooth was sick, rotten, neglected; but now it is filled." Gold fillings stare at one with a keener gaze than others. Incisor and canines can often be filled from the palatine surfaces, and thus secure modesty.

H. S. C.

To Keep the Spittoon Odorless.—"Two or three little cups" to spit in, tumblers for washes, and to drink from, all in use and in a row "on the top of the cabinet," may be "far more convenient and wholesome" for the use of some dentists than a properly cared for concealed bowl beneath a glass funnel. But the paragraph suggesting that a few crystals of potash thrown into this bowl would insure sweetness while in use was written for the express benefit of those who believe that "cleanliness is godliness," and that uncleanliness to the eye is as offensive to decency as impure odors are to the nose. R.

SOCIETIES.

BROOKLYN DENTAL SOCIETY.

Regular Monthly Meeting May 8th, 1882.

LECTURE BY DR. CARL HEITZMANN, ON THE MOST RECENT DISCOVERIES IN THE MINUTE ANATOMY OF THE TEETH.

Mr. President and Gentlemen of the Brooklyn Dental Society:

The Bible tells us that many thousand years ago the Lord built Adam from mud, and that after this was done he took a rib in order to form Eve. If we consider the difficulty to make a model of the human form, especially to carve such a large number of teeth, before life was blown into them, we must conclude that to-day, somehow or other, the work is done in a very much easier way. You know that it is pretty difficult to manufacture a set of teeth artificially, but to make a real, live set of teeth, is quite a different process. You know that two parties and two parts come together—the ovum of the female, so small that it hardly is to be seen with the naked eye, and the spermatozoids of the male, which are not visible to the naked eye, but perceptible with a magnifying power of the microscope of 500 diameters. From the moment these parts commingle, a new individual starts, full of wonders and with an organism complicated beyond description. Think of it! One part is destined to produce muscles, another part builds up the frame or skeleton, a third part produces the organs of the nervous system, and last, but not least, the teeth, with all their wonderful complexity of detail. The Lord blew life into them many thousands of years ago, they say, and it took us several thousand years to find out where the life of a tooth is located. The work of the last four or five years has enabled us to tell positively that the teeth are really alive, and it is the purpose of my lecture this evening to tell you something about the seat of life in the teeth. First let us consider what we call life as such. New life begins with a little churning, as Dr. Atkinson has called it, in the ovum soon after it is impregnated—a movement in the germ fructified under the influence of the spermatozoids, which we do not understand at all; and soon afterward, in the first twenty-four hours, enormous numbers of small corpuscles have arisen from the original ovum. These corpuscles, which we call indifferent corpuscles, form the medullary or embryonal tissue, and this is the very tissue from which all the tissues of the body arise. The

result is quite respectable indeed. The baby new born is an admirable little thing; but that baby grows for say twenty years, and reaches the height and bulk of my body, or still taller, perhaps to the size of Jumbo, for he is produced in the same manner. In this way life is blown into the organism. But *why?* is the first question; and is it a blessing that the Lord blew life into us? is the second question. The why is no question to decide at all; we are but too happy if we can tell the how. The why will perhaps be answered after a number of years, when we know exactly the how, but it must be omitted from consideration for the present. We admire the complex condition of an organism of living matter. It is a division of labor which leads to the development of the muscles, the skeleton, the teeth and other organs; but why all that is done, we canot say. The aim of life is just as great a puzzle. What for do we live? Why are we in the world? You cannot find two persons who will give you exactly the same answer to that simple question. I once asked a beautiful lady: Why are you in the world? She looked at me thunder-struck, and thought it was a very rude question. But if you go to the bottom of things, perhaps one says, to worship God, to pray, to sing hymns; another, the Yankee, says we are here to make money and fill our pockets; a third has another idea: Enjoy life, he says, eat and drink and have pleasure. The fourth will say: No, there is some aim for life, and it is to search for the truth, to dig in order to get a little particle of truth from that immense and complex mass called nature, and find out something that will stand proved to our senses; this is an aim for your life, and if you do this you will not live entirely in vain. This latter opinion is mine. As to the second question, whether life is blessing, I must, I am sorry for it, deny that it is. Living matter has a capacity of growing and reproducing its own kind, and this law is compulsory to every one. So long as we grow, we build up our bodies; but as quick as we have reached a certain bulk, as soon as we have stopped growing, there comes an impulse to marry and produce children. We must admit, however, that there is no blessing in life at all, for it is a chain of sufferings from birth to the end. If you think of the teeth alone, what a large amount of suffering they bring us, and these are perhaps the least sensitive portions of the body. Think of the diseases, the weaknesses, the sorrows and cares of that little life, which lasts in the best case say eighty or ninety years. But let it last for 200 years, which is the case with the elephant, and still we must admit that this is a short time, if compared with eternity. The teeth especially give rise to a number of

sufferings, and fortunately for you, because they keep you busy, and you live on that suffering. Were there no teeth, and especially no nerves, you would not earn bread and butter. But it is a wise arrangement in nature that the sufferings find their remedies; and in this respect dental work especially is a most successful department of medicine. I am very fond of dental work,—provided it is done on somebody else! I am very fond of the investigation of the teeth. By this digging for truth, we of course gain a certain amount of knowledge as to the foundation of our medical work; and then we can say that there will be progression in medical work. A kind of reasoning must result, and medical interference will cease to be strictly empirical. Instead of being rough and mechanical work, it will gain scientific foundation, and for this we work, for this we strive.

The medullary or embryonal corpuscles that I mentioned before, are the very formers of the body. They are little marvels indeed. We know by comparison of facts in different organisms that there is not only similarity but identity, in the strictest sense, in all the organisms throughout the animal and vegetable kingdoms. We know that the lowest animalcule, the amoeba, such as we find in a little drop of puddle-water, is built up by the same substance as the most complicated and highest developed human being. In 1835, Mr. Dujardin, of Paris, first discovered that peculiar jelly-like mass for which he proposed the name sarcode, from the Greek word "sarx," meaning flesh; and "eidos"—like. This word would have been a good one, indeed, if Mr. Dujardin would have recognized the identity of the sarcode throughout the animal kingdom. But unfortunately he was far from such knowledge. Much later, in 1861, Max Schultze, of Bonn, in Germany, first announced that the matter which builds up infusion animalcules and that building up the human frame, as well as all the animals between these two extremes, is one and the same thing. It is, in the widest sense of word, the *living matter*, and for it he proposed the term protoplasm—"proto" being the Greek word for *first*, and "plasma" the formed. The word did not originate with Max Schultze; it was first taken into our nomenclature by a botanist, Hugo Von Mohl; but Max Schultze was the first to propose it for the designation of the material composing animals in general. Meanwhile Schleiden, in 1837, and Theodor Schwann, in 1839, announced that there was an ultimate element in the construction of vegetable and animal organisms, and for this they proposed the term *cell*. The word cell was taken up especially by the German microscopists. The word protoplasm means living matter,

and the word cell means the ultimate element or unit of living matter, therefore the definition was, according to Max Schultze, that the cell was a lump of protoplasm, protoplasm meaning something endowed with life in general. Max Schultze said that the nucleus that we find in the so-called cell is something essential to it; and he added that the granules likewise belong to the structure of the cell. In the same year, 1861, he was contradicted by critical men, such as Ernest Brucke, who said they knew of many lumps of protoplasm or cells which did not exhibit a nucleus. As to the granules, he said perhaps they are taken in from without; perhaps they are secondary formations, and did not belong in the schema of the cell. Gradually the idea developed in the minds of German histologists that protoplasm, or living matter, was devoid of structure. If you read the book of Stricker on histology, issued in this country in 1872, you will find this definition of the cell: "A structureless mass of protoplasm." This condition of things you will admit was not very satisfactory. In the first place, we all realize that a thing destitute of structure could not exist; and, in the second place, there was no proof at all at that time that the granules were really extraneous. When I took up the study of protoplasm in 1872, I had before me a blank book. A structureless mass is a very unsatisfactory definition to be sure; and what I was after was just to find out whether this protoplasm was really structureless. The results of my researches were contrary to the assertions of histologists at that time; it was proved that what they called protoplasm, was a very complicated organism. A lump so minute that it is only perceptible with a power of 500, if magnified up to 1000, displays a marvelously complicated structure, which essentially can be designated to be reticular in nature. The reticulum I announced to be the living matter proper. This in its first appearance is a granule and is homogeneous, viz: with our present means of observation we cannot discover any structure in it. The granule grows, takes in liquid from without, and is supplied with small cavities scattered throughout its mass, the so-called vacuoles. At a further stage of development the walls of the vacuoles break down and a reticular structure is established throughout the lump of living matter. I proved that the nucleus, connected with the reticulum, and the investing continuous layer, are also formations of living matter. The reticulum contains a liquid destitute of life. When we take a broader ground we can say that everything is alive, as is water, too, but from the biological standpoint it is better to say that liquids are not endowed with the properties of life.

Now, as a new discovery was started as regards the structure of protoplasm, the question arose: Are not all the parts of the animal body reticular in structure too? By carrying my researches through all parts and tissues, I came to the conviction that in fact this reticular structure is present throughout all the tissues constituting the body. It is this particular structure that has been proved to be present in the teeth, and this reticulum is the seat of life. We know that it contains all the properties and characteristics of living matter, and we know, therefore, from its shape, that it is alive even if we cannot see its motion, change of shape and place. Whenever we see this living matter which is characterized by a number of appearances when subjected to certain limited chemical agents, we can say: Here we have to deal with living matter, that is, with matter which will react upon irritation, and grow and reproduce its own kind upon being irritated.

The reticular structure of protoplasm was discovered in 1872, and was publicly announced to be present by myself in 1873. I was not the first to claim that such reticular structure does exist. Before me, it has been seen by several investigators, though none of them had found it to be a universal law and recognized its value and its meaning. Toward the end of 1874, when I left the old country, one of the first things I took hold of here were micro-photographs, made in Washington by J. J. Woodward. They were not produced with a very high power, but with very strong oxy-calcium light. In these photographs we can see the reticulum with the naked eye, but still better if a little magnified. Since that time the recticular structure of so-called protoplasm has been acknowledged by the very best microscopists abroad. I have demonstrated it to a large number of attendants at my laboratory in New York, still there are people who not only cannot see this reticulum, but doubt its existence. Dr. Lester Curtis, of Chicago, was very anxious to see the reticulum in protoplasm; he wrote me two letters asking my advice, nevertheless he failed to see it. Lester Curtis, instead of keeping still, published an article in the transactions of the American Microscopic Society, in which he states that he is unable to see the reticulum and that he did not meet with a man who has seen it. A positive statement, as you know, is to be published and made known to the scientific world; but a negative statement should be retained, provided that the positive statement is made by trustworthy men. You know that microscopy is a difficult art. I am a draughtsman, my eye was educated by drawing all the time, and by such an education of the eye I was enabled to see what is to be seen.

And what I announced was proved by a number of good observers. Last week I had a letter from Buffalo, from Dr. Barrett, asking me to tell him how to do the work in order to see the reticulum. He alludes to Lester Curtis' article, and tells me that he put the lens so, and so, trying to see the reticulum. He kindly writes that once in a while it occurred to him that he could see it, but his friend opposed the idea and he gave it up. I replied: Dear Doctor, you will admit that it is very unpleasant work to me to keep stating that the reticulum is visible; and if you think of the fact that it is acknowledged by the best microscopists to be easily visible, I think you must admit that the fault is either in your lens or in your eye. In the first place, good lenses are rare. I have tested a large number of lenses from the best manufacturers in the world—French, German and American, and I very often have to refuse immersion lenses.

The second blunder is that the eyes are not sufficiently educated. If I hand a violin to a gentleman who never played a tune and ask him to play, he will certainly politely refuse; but will he write an article on that and tell the public that he tried to play a tune on the violin and could not do it? If he is in earnest, he will take lessons a few months or years, and then he will be fit to play a tune. It is the same with the microscope. At first you are perfectly at a loss. It is a difficult art to learn to see; but still I maintain that this reticulum is easily seen, without the least difficulty, if you are led by a teacher, who tells all the little improvements in method, all dodges and kinks. One of the great geniuses of this country, Dr. Dio Lewis, of Boston, worked in my laboratory for three months. After a few weeks I was anxious to teach him all these little things in the structure of protoplasm and I showed him how to look. He jumped up and said: "I can see the reticulum with my hands tied behind me; I don't understand why people cannot see it."

Prof. S. Stricker, one of the most careful of men, my tutor in 1873, hesitated to accept the existence of the reticulum, but he advocates it now himself, and recently describes it in saliva-corpuscles. Of course I cannot ask everybody to come to my laboratory and look at it. I might go wherever there are gatherings of microscopists and histologists and show it to them; but I am afraid such demonstrations cannot be made in a haste. It takes a preliminary education of the eye before the eye is ready to see the reticulum. The trouble is that most people look a little through a lens and then imagine that they are prepared to see all there is to be seen. I must insist upon the educa-

tion of the eye as the first thing necessary, and I repeat that the moment the eye is prepared to see, it will do so without difficulty. This reticular structure is present in the teeth, and with all that I have said so far, I think we are ready to enter upon the discoveries which I am a little proud to say have started from my laboratory.

When I came over here, seven and-a-half years ago, I said to myself: You go to America, take your family along and establish a scientific laboratory and try to instruct physicians there; in short, try to raise the standard of medicine. A few friends I had here, laughed at my idea and took me for an idealist; you may try, they said, but you will fail sure. I knew very well, gentlemen, that would I have come with mere ideas, suggestions, hypotheses, dreams, I would have been a lost man. You Americans do not care much for fancies, I am sure, and justly too; but I knew that if I brought facts and could show them, I must prosper. And the result was beyond my expectations—surprising indeed. The first two years my laboratory was not sufficiently known, and the success was not very great. From the third year, my laboratory was an enormous success. I started with four tables and four microscopes, and to-day I dispose of seventeen tables and seventeen microscopes, which nearly all the year round are occupied. Why have I succeeded? Simply because I could convince honest men of the truth of my discoveries. I know that from the moment that only two or three dozen honest people are convinced of the truthfulness of my assertions, I cannot be a lost man any more. My work must grow because a number of earnest men are convinced that here is real truth to be found.

One of the earliest attendants at my laboratory was Dr. Boedecker, of New York. He asked me how to prepare specimens for microscopic research, and he brought me some of his old specimens of teeth ground in the old-fashioned manner. I told the doctor that he would never succeed with such kind of material. I said to him: If you are anxious to see the frame of a tooth, it is well enough to grind the dry tooth for examination, but if you are anxious to find something better than that, the seat of life and the living matter within the teeth, then you must resort to entirely different methods. You must place the teeth in a solution of chromic acid, then cut a thin section with a razor and study the features under the microscope. Dr. Boedecker carried on this investigation for several years, in spite of his busy practical work. Shortly after Dr. Boedecker commenced his studies, Dr. Abbott came, and almost simultaneously the good angels brought Dr. Atkinson to my laboratory.

What we have found I propose now briefly to explain. The main tissue in the teeth is the dentine. This dentine is, as has a long time been known, pierced by canaliculi, which run in a regular direction and were for a long time known to contain very delicate *fibrillæ*. You know very well that work upon the dentine is by no means painless, and that when caries invades it the pain, though not very intense, is present, especially upon change of temperature. This and a number of other facts are indicative that the dentine is endowed with life. Facts known for over a hundred years strongly point in favor of this idea. I allude especially to the researches made by the great German philosopher, Goethe, who studied the teeth of elephants—which are materially identical with human teeth—into which bullets had been driven. You know that the elephant hunter's target is the socket of the eye, that being the only place through which a ball can penetrate. This target is often missed and the ball sometimes lodges in the tusk and remains there embedded for years, producing quite a revolution in the dentinal structure, which is not fully explained. A reaction is established where the ball has penetrated, which is a sufficient proof of the life of the dentine. Dr. Boedecker discovered that the fibrillæ piercing the dentine in the canaliculi are living matter. Projections of delicate offshoots into the walls of the dentinal canaliculi were demonstrated, and a reticular structure throughout the dentine, which is an indication that the living matter pervades the whole dentine, and that not only the fibrillæ seen in the canaliculi are forms of living matter, but also the offshoots which connect them through the basis-substance. A direct proof has not yet been obtained of this. The process of caries provides an almost absolute proof of the presence of the reticulum throughout the dentine; but an indirect and secondary proof is of little value. We would better not assert a fact upon that evidence alone. These facts are left to be established when we shall have more perfect lenses, with a stronger power than glass. Dentine, therefore, so far as we can see, is pervaded by living matter within the canaliculi.

The second tissue of great importance to the teeth is the enamel which covers the crown. Formerly enamel was considered, by even the best dentists, as being simply a crystal or a piece of marble, in spite of the fact that even this enamel showed symptoms of life. I omit to mention the reaction upon caries, which could not occur had the enamel no life. But if you bite into a sour apple, or eat a sour orange, your teeth will react upon the acid. It is in vain to assert

that the acid destroys a little of the enamel and so reaches the life beneath. If small particles of the enamel were destroyed every time you eat an apple or an orange, there would soon be none left at all. Another explanation is that the acid irritates some part of the enamel, and this irritation is carried down to the nerves, and that makes the teeth stand on edge. Now Boedecker was the first to discover the seat of life in the enamel. All the delicate fibrillae that penetrate into the enamel are formations of living matter, the so-called enamel fibres; the whole enamel is pervaded by the delicate reticulum, which is probably living matter also. But this is not yet demonstrated. From the moment the enamel was proved to be endowed with life, it was made a tissue. A connection is established between the dentine and the enamel in several ways. In the first place, you notice that the boundary line of the dentine toward the enamel is not even, but is supplied with excavations, in which we find formations of living matter more numerous than in the dentine or in the enamel. This layer was proposed to be termed the interzonal layer by Dr. Atkinson. The living matter appears in the shape of a net-like arrangement, or in that of hooks, being evidently destined for the connection of the dentinal with enamel fibres. In many places the dentinal fibrillae are not directly connected with those of the enamel, but there is a reticular structure between the two, from which gradually emerge the enamel fibrils. Dr. Tomes, of London, who is, of course, anxious to see all that we describe in America, wrote Dr. Boedecker a letter saying that he could see everything except the enamel fibrillae, which are in fact not easy to see. It took me quite a while to be positive of their presence. But we have a means of making them plainly visible. Look in the first formed enamel cap of a human fetus of seven to nine months, and there you will see the enamel fibrillae very well indeed.

The third tissue which became plain in its minute features, was the structure that surrounds the root of the tooth, and which we call the cementum. It has been known for quite a while that this cementum is bone. Trials have been made to bring out differences in structure between bone and cementum, but they are so far failures. In this tissue Boedecker showed that the so-called laminae and their offshoots, the canaliculi, contain what is called protoplasm, that is, living matter, in a reticular arrangement. Dr. Boedecker was the first to show that the cementum covering the neck of the tooth is destitute of bone corpuscles and of laminate structure, but that it has peculiar spindle-shaped

formations of living matter. All these facts, which have been obtained independently of practical work, are in beautiful harmony with what we know about the sensitiveness of the teeth from practical operations upon them. The greatest pain, when you work upon a tooth, is felt when you reach the interzonal layer. Another sensitive portion is the neck of the tooth; and the reason is because these parts are supplied with so much living matter. Dr. Boedecker demonstrated that the reticular structure is present in the cementum in the same distribution as in the bone; but the finest reticulum pervading the basis-substance is not yet proved directly to contain living matter.

The fourth tissue of importance in the construction of the teeth is the pulp tissue; in this Dr. Boedecker made his latest discoveries. The pulp tissue proved to be composed throughout of myxomatous tissue, which is the first to form in the embryonal body in its earliest stages of development. It represents a jelly-like mass; and what we call the umbilical cord and the placenta are composed of myxomatous tissue. In former times it was thought that in the body of the adult there was but one place where myxomatous tissue could be found, namely, the vitreous body of the eye. To-day we know this tissue to be present in the lymphatic ganglia, or lymphatic glands, and the pulp of the teeth also. In former years I was of opinion that the pulp was myxomatous only in juvenile teeth, and that in a more advanced age the pulp becomes fibrous. Dr. Boedecker has proved that this is not quite so. The myxomatous condition is the normal physiological condition of the pulp, while the fibrous condition is the result of morbid action and inflammation of the pulp, which destroys the myxomatous tissue and replaces it with fibrous. Thus full harmony is established with other fibrous structures, and we come a step nearer to understand the formation, called pulp stones.

At the boundary of the pulp, close to the dentine, there is a row of bodies, which are medullary elements. They have been discovered by Tomes, and termed odontoblasts. Some histologists were under the impression that the odontoblasts were epithelia; but this view was disproved, and it was demonstrated that they are nothing but embryonal elements, such as are present whenever a tissue is about to change into another, as it is in the change of pulp tissue into dentine. The medullary or embryonal corpuscles are arranged in rows, and between the rows we see the dentinal fibres going down into the pulp tissue. The dentinal fibre is not in immediate connection with the

odontoblast, but rises up between the odontoblasts. This arrangement was found to be in relation to the nerves of the pulp. The medullated nerve fibres, upon approaching the periphery of the pulp, lose their medullated character and become non-medullated. The nerve fibrillae running between the odontoblasts are either directly or indirectly connected with the dentinal fibrillae, thus establishing communication from the outer part of the tooth down to its center. Tomes, Sr., suggested that perhaps the dentinal fibrillae might be nerves, and he came very near the truth. In fact, we know that formations called nerves and the dentinal fibrillae are built up on the same plan ; it is only from the greater mass of living matter that certain filaments deserve the name of nerves.

As soon as we have an insight into the structure of the pulp, the forms which are partly due to senile metamorphoses are explicable. Secondary dentine, as you know, invariably forms in the outermost portion of the pulp-chamber. In advancing age, the more the tooth is worn, the more secondary dentine is formed ; and the same, if caries invade the tooth. We see that irritation brings out secondary dentine. There is one law governing the formation of primary or normal dentine, and that of secondary dentine, which latter appears in three varieties : With irregular canaliculi, with lamellated basis-substance and with bone-like formations, termed osteo-dentine. Dr. Boedecker made researches on inflammation of the pulp, which brought out entirely new facts. Pulpitis, as a primary process, occurs almost invariably where there is secondary dentine. First, a gentle irritation going on, will bring about a tolerably regular formation of secondary dentine ; then, the irritation becoming too severe, inflammation sets in, which again destroys the secondary dentine, in many cases necessitating surgical interference. The so-called pulp-stones have proved to be identical with secondary dentine. A mass of regular bone tissue also has been found in a pulp-stone and preserved by Dr. Boedecker.

The next tissue which was carefully examined is that surrounding the root of the tooth, which is fibrous connective tissue in connection with the tissues of the gums and the periosteum of the socket. The fibers run obliquely and suspend the tooth in its socket, giving it a certain degree of mobility, which leads to the formation of facets at the proximal surfaces. For this tissue Dr. Boedecker proposed the term pericementum, which, I think, ought to be adopted. There can be periostitis outside the socket, and how shall we distinguish it from

that within the socket if we reject the word pericementum? However, this tissue proved to be full of living matter, just as any other fibrous tissue; it is directly connected with that of the cementum, and with the Haversian canals of the bone tissue. This explains why, whenever a destruction of pericementum takes place, necrosis of the bone will result. The features of pericementitis are described by Dr. Boedecker. We may discriminate between the two varieties of plastic and suppurative pericementitis; this latter again being either a so-called pyorrhoea alveolaris or an alveolar abscess. Another process which can be understood upon the minute anatomy is the process of caries. Dr. Abbott found that in caries the enamel as well as the dentinal tissue is first deprived of its lime-salts, due to the presence of some acid, and in the next step they are reduced into their embryonal or medullary condition through the process that we are accustomed to find in every inflammatory action. While in other tissues, whose supply of blood-vessels is abundant, a reaction follows, the medullary corpuscles increase in number and bring about a new formation; in caries, which takes place in tissues destitute of blood-vessels, the medullary corpuscles do not produce anything, but become subject to disintegration and the seat of growth of leptothrix and bacteria. The inflammatory process proceeds to a certain step where it stops, and destruction of the tissue follows. The idea that leptothrix pervade the tissue ought to be abandoned; its growth is proved to be secondary to the inflammatory process of caries. Dr. Abbott accidentally met, in his studies, with a feature which is strongly in favor of Dr. Boedecker's assertion as to the presence of enamel fibrillæ. For microscopic study, enamel must be ground, but not dry, of course, on the wheel of a corundum lathe. I have examined specimens where the enamel was accidentally removed and the enamel fibres were plainly visible protruding from the specimen in so characteristic a configuration that not the least doubt could arise as to their nature.

The last point to be entered upon is the development of the teeth. It is one of the most interesting processes that we know of, and is very complicated indeed. We know that the first start of the development in the third month of embryonal life, is that the surface of the epithelium in the oral cavity sends a prolongation downward. A tooth, therefore, is epithelial in its first stage of formation, the same as all other horny formations. The teeth are transformed from the epithelial into the medullary tissue, and from that arise all other dental tissues. Especially the formation of the enamel can be understood only by

sustaining this theory of reduction. Why teeth should start as epithelial forms is a puzzle, unless we take the ground of Darwin that we find analogies in the development of the organs of animals; we find quite a number of animals which, instead of teeth, have horny epithelial formations in their oral cavities. This would indicate that the teeth originally start as epithelial forms in their lowest stage of development. From the epithelium a medullary tissue arises which becomes myxomatous, as the pulp tissue does, then breaks down into the medullary stage again, and lastly forms the enamel. Waldeyer claims that each epithelial body is calcified; while Kölliker believes that the calcified mass is a secretion of the epithelia. Neither of these assertions is correct. The truth is that the enamel is built up on the same plan as dentine, from medullary tissue—the only difference being that in the former the start is epithelial in nature. Dentine is for a long time known to originate from medullary elements. How the cementum is formed we do not know yet.

Now, gentlemen, I have had the pleasure to bring before you, in a rather brief way, the results of the researches made in my laboratory in the last four years. You perhaps may ask: What is all that good for, though I hope you will not. If you want to be scientific dentists you must know the material on which you work, every particle of it. In order to be more than a rough, empirical tooth carver, but able to think and judge about the material on which one is working all the time, it is necessary to know what I have endeavored to tell you. You cannot touch the teeth with your instruments without inciting an action on the part of these tissues, which can be beneficial if you do your work properly, and detrimental in the highest degree if you do your work without the knowledge of the anatomy of the teeth. The reaction of dentine is best observed in teeth which went through the hands of the old dentists, who thought the enamel was simply marble or crystal; they did not mind trimming it away when they found a cavity that was not easily within reach. But no such thing is admissible to-day, for it deprives the tooth of its best protecting material. Pull a tooth, but do not touch the enamel unless it is absolutely required; do not remove more than the process of caries has already destroyed. If you work without discrimination between the dentine of old and that of young persons, or between a person of feeble constitution and another who is strong, having more lime-salts, then you make a great blunder. What a number of provisional teeth are lost because the filling is too severe and causes reaction! This could be obviated, and a little protection will save the provisional teeth.

The value of our work is not immediately seen, but we know that scientific work, as such, never brings direct results. Electricity originally was nothing but an experiment in the hands of some thoughtful man, sometimes perhaps but a little play-toy, but to-day it is a very powerful and useful thing. It is very much the same with this minute anatomical knowledge. Do not look too much for practical value, but take it as something worth knowing without any further usefulness, and then this may come in many points of which we do not dream yet.

Dr. Brewster: I would like to have Dr. Heitzmann give us some information in regard to Nasmyth's membrane.

Dr. Heitzmann: It is a subject I did not allude to, for the very reason that there is a discrepancy of opinion about its significance. Dr. Atkinson adheres to the original idea of Nasmyth, that it is a layer of cementum overlapping the crown of the tooth. Afterward it was found that it is epithelium, judging from all the analogies in the body, namely, that all cavities which are in direct or indirect communication with the outer world are lined with an epithelium. I think that this epithelium is nothing else than a prolongation of the epithelium of the oral cavity, which covers also the gums. I know that Dr. Atkinson does not agree with me in that, but I put it down according to my own conviction. For the study of Nasmyth's layer, we had not very good specimens of human teeth, but some excellent ones of cats, on which this point was displayed elegantly.

Dr. Atkinson: Let my first words be of congratulation to this body that they have enjoyed such a treat as we have had set before us to-night, and which is the culmination of the work of many honest men of profound researches and of clear determination in their minds to arrive at the truth irrespective of consequences. And I would rather speak of our agreements than of our disagreements, for wherever a disagreement comes, it necessarily involves a conception of ignorance being its source on the part of one or the other of the disputants. I have strong convictions myself, and when I take a position, I hold myself open to be examined as closely as human intelligence can examine a subject, and when I set down any observation as being irrefutable, I go for it with my whole power. Where it is a matter that is more in abeyance, I am as kind as a kitten to every man's view, whatever it may be, so much so that those who hear me now will bear me out in often having said that I owe more to my pupils than to my teachers as a rule. That does not hold good in regard to the noble gentleman who has spoken to us to-night. He has been the means of explaining to

me many things that were ambiguous; and I wish to emphasize his recommendation to educate the power of vision, so that the eye will present to the tablet of the mind a truthful interpretation of what is presented. If I am moved in my affectional forces toward any set of my fellow-men who are engaged in scientific research more than toward any others, it is toward the neurologists, and especially toward the German or European investigators. They seem to have been so close in association as to be more or less a stimulus one to the other, so that they have taken up special departments, and thereby have brought out more than they could have done if they had all attempted to accomplish the same work in a general way. A careful reading of the works on histology and natural history will justify everything that we have heard to-night, and it will justify me in saying that the men who made the drawings in those works, and who knew nothing about them at all, were really honest men, for they did draw Max Schultze's thorns in the reticulum in the dentine, even as early as the work published by Professor Owen. If you will look over the representations of the human teeth in that work, you will find that they are fully represented there, and without one word of explanation in the text. Why? Because the idea had not found a lodgment in the mind of Professor Owen, or any of the noble men who assisted him. I had much of sorrow in being made acquainted with these men on my last Summer's trip, because I am impressed with the idea that most of the men who have been leaders there—I will except John Tomes—have had the real workers behind them, and they, being in government employ, have utilized the labor of their boys and given it out as their own labors; and this is proved by the fact that they have failed to explain what was actually drawn by the observers of the specimens in the drawings I have referred to. I am proud that the managers of this, my pet society, had the intelligence, during the time I was lying on my back, to ask this noble worker in the cause of science to come and give you this useful and scientific presentment of what is only lately revealed in the world of natural history. I want also to plead with you to heed his worthy, truthful, religious remarks, when he says you must understand the material with which you deal if you expect to do clean work. We had observed, in a way, many of these things, but we did not know how to explain them. There are many things still, as he has so beautifully and with child-like simplicity said, that we have not proved yet that this is living matter, but he holds out the hope, that is always a stim-

ulus to every one in search of truth in nature, that some time we may be able to get a reflecting medium better than we have yet had, so as to amplify to a greater extent these fine structures, and the truth may then be revealed. You will remember that my friend, Rufus King Brown, stated that he had spent some time trying to get objectives for the diamond. He did not succeed. It is a great pity that scientific seekers, when they have received such a revelation of truth as has been presented to us in this rich syllabus, are still not satisfied to accept it, but hold out a stimulus to make the boys go on in the old effete way.

I have often said to my pupils: If you do not beat your teachers, and your fathers and ancestors in their line, you ought to be spanked, for you have such facilities as were not vouchsafed to us. My first instructor was Professor Goadby, of London, in the year 1856, in Cleveland, Ohio; and from that day to this I have the name of always doing my utmost to get hold of the truth. I think it was an endowment from my mother—a desire to do faithfully and honestly all the work of this life. I inherited it; I do not take the credit personally at all, that I was enabled to understand better the material I was working upon because of the differentiations I saw. I read medicine generally, and I took up a specialty just because dentistry was not overloaded with so much bad precedent, and was not so overloaded with lies in the text-books as to make it necessary for a man to have a Herculean power not to be overborne by the heresies that they put forth as truth. As you love success, and the commendation of a quiet conscience, I would repeat my old advice: Go to Heitzmann and take a thorough course of instruction. Take a little, if you must, but the better way is to go and take a thorough course of instruction and get hold of these truths, so as to be able to do something better than Lester Curtis did. It occurs to me, too, how many of us are of such easy virtue as to accept a fallacy, and give it our adhesion, almost in preference to accepting the truth when it has been demonstrated to us.

Dr. Mills: It has occurred to me that it would be an excellent idea to take these lectures of Dr. Heitzmann and put them in comparison with the statements made in some papers published in the Cosmos by a young man in Maine, Dr. Williams. He is evidently a very earnest student, although he has been somewhat obscure. If you will read the articles published last month by Dr. Williams, in regard to the Hesto Genesis of the teeth, you will find there an an-

swer from him, regarding the Nasmyth membrane, which Dr. Brewster inquires about. He takes the ground that there is a skin over the teeth. These things are interesting to read by comparison. They are all matters of interest; I know they are to me. I do not think I need say to Dr. Heitzmann that I am interested in his subject. My continued attendance at his laboratory testifies of it. The papers read by Dr. Boedecker, lately, are intensely interesting. One thing particularly interested me in this lecture very much, and that is the subject of pericementitis. It proves conclusively the claim made by Dr. Riggs, in regard to the destruction of the process by this disease, at certain stages. It has been disputed a great deal, and it is well enough for us to know the truth of the matter, and keep it in mind. For myself, I see in the treatment of this prevalent disorder a mission, and I am desirous of securing every confirmation, *especially* from acknowledged authority such as this.

On motion of Dr. Mills, a vote of thanks to Dr. Heitzmann, for his excellent lecture, was unanimously passed.

Dr. Cooke: I would recommend the reading to this Society, in the presence of our friend, Dr. Mills, an article just published in the British *Journal of Dental Science*. It was read before one of the German societies, and treats of Piorrhea Alveolris, or Infectious Alveotitis, by Adolph Witzel, of Essen, Germany.

The next meeting of the Society will be held at the house of Dr. Wilder, 64 Fort Greene place, and the above articles will be read and discussed.

Connecticut Valley Dental Society.—The semi-annual meeting of this Society, for 1882, is to be held at the Amherst House, Amherst, Mass., June 29 and 30. Rates at this hotel to dentists will be reduced to $2.00 per day. The attractions of this beautiful village are many. Among those, to strangers at the college, may be named the Indian antiquities, cabinets of geological specimens, and art gallery. Dr. Williams, of No. Vassalboro, Me., is expected to be present and contribute an essay. Prof. R. R. Andrews, of Cambridge, has promised to be present with some interesting microscopical work.

Railroad Connections.—Trains on the Fitchburg R. R., leaving Boston at 6.30 and 11.15 A. M., make close connections at Millers Falls for Amherst. Train leaving Brattleboro at 10.00 A. M., leaves

Millers Falls at 11.30 A. M. Trains on Boston and Albany R. R. at 5.00, 11.00 A. M., and 4.30 P. M. from the East, make close connection with N. L. and N. R. R. at Palmer. Parties from the South should go via Palmer, as there are but two stages daily from Northampton to Amherst—at 4.00 and 9.00 P. M.

Per order Executive Committee,

A. M. ROSS, *Sec'y.*

CHICAGO, April 5, 1882.

To the Editor of the New England Journal of Dentistry:

The annual meeting of the Chicago Dental Society was held the evening of April 4, and the following officers were elected for the ensuing year:

President—E. S. TALBOT.
1st Vice-President—FRANK H. GARDINER.
2d Vice-President—A. W. HOYT.
Recording Secretary—H. F. KIMBALL.
Corresponding Secretary—A. W. HARLAN.
Treasurer—E. D. SWAIN.
Librarian—JOS. G. REID.
Board of Directors—GEORGE H. CUSHING, J. N. CROUSE, EDMUND NOYES.

Respectfully yours,

A. W. HARLAN,
Corresponding Secretary.

MASSACHUSETTS DENTAL SOCIETY.—The seventeenth semi-annual meeting of the Massachusetts Dental Society will be held at Codman and Shurtleff Hall, 167 Tremont street, Boston, Mass., on Thursday and Friday, June 8 and 9, 1882, commencing at 11 o'clock, Thursday morning.

W. E. PAGE, *Secretary.*

The New Hampshire Dental Convention will meet on the 20th of June, 1882, at the parlors of the Phenix Hotel, Concord. Convention to be opened at 11 A. M.

BIBLIOGRAPHICAL.

Civilization in its Relation to the Decay of the Teeth—A paper of Dr. Norman W. Kingsley, M. D., D. D. S., read before the International Medical Congress at London, August, 1881, has appeared in pamphlet form. As we printed it in our January number, we need not say that we consider it excellent.

Manual of Dental Surgery and Pathology. By Alfred Coleman, L. R. C. P., etc. Thoroughly revised, and adapted to the use of American students and practitioners, by Thomas C. Stellwagen, M. A., M. D., D. D. S., professor at the Philadelphia Dental College. The book contains twenty-three chapters. Very interesting to read is the chapter on Dental Caries, though the author with almost unintelligible neglect of the fact of well observed decay on ivory-teeth, leans to the "chemico-vital" theory—a most unlucky word. The chapter on "Selection of Instruments" is added by the American author of the adaptation. This chapter contains a great number of illustrations of fine instruments from cuts of the S. S. White Manufacturing Company of Philadelphia. Some of our friends thought such a kind of advertising as a lowering of the value of the book, but it seems to us quite the contrary. The profession will be far better served by exact cuts of real existing and obtainable instruments, than by diagrammatic more or less impractical and unreal sketches of instruments, which cannot be bought anywhere. Here the reader gets clear, plain illustrations, and a source where to obtain them ; it is just as proper for the S. S. White Company to get their instruments specially described and illustrated as it is for writers on microscopical investigations to describe the instruments they used and to give the address of their maker. We do not wish to be understood to say that the tools of other dental manufacturing concerns are not just as good ; they may, perhaps, be better. But there can be no doubt that the use of advertising cuts in the book is as legitimate as any. Another chapter added by the American author is Chapter xii.—Fitting Artificial Crowns to Roots of Natural Teeth—a subject now quite familiar to American dentists. The chapter on Anæsthesia, though not very profound, is quite interesting and practical. Dr. Coleman thinks "Ethidene dichloride" pretty safe to use. But

what is it? We never read exactly that name before. Chemical formulæ of organic compounds can no longer be expressed safely by a word; the formula should be given, and even the constitution. Is it perhaps ethylene-dichloride $CH_2Cl.CH_2Cl$, or ethyliden-dichloride $CH_3.CHCl_2$?

OBITUARY.

At a meeting of the Chicago Dental Society, held May 2, the following preamble and resolutions were unanimously adopted:

Whereas, It has pleased the Supreme Judge of the Universe to call from among us our esteemed friend and associate, the late D. C. Hawxhurst, whose untimely decease was due to his untiring efforts in the pursuit of professional knowledge; and,

Whereas, We have been deprived of the companionship and counsel of our brother, whose ability and learning, unsullied reputation, and high sense of honor, have endeared him to the memory of his associates, it is right and proper that we should show with what feelings of deep regret and sorrow we learned of his untimely death; therefore,

Resolved, That in the early decease of Dr. D. C. Hawxhurst, our profession in general, and the Michigan State Dental and Medical Associations in particular, have lost a useful, wise and good brother.

Resolved, That his generous, manly character, and studious habits, command our admiration, and his example our earnest following.

Resolved, That to the family of the deceased we tender our heartfelt sympathy, in this their time of bereavement and mourning.

Resolved, That a copy of these resolutions be sent to the family of the deceased, to the Michigan State Dental and Medical Associations, and a copy transmitted for publication to each of the dental journals.

T. W. Brophy,
A. W. Harlan,
Geo. H. Cushing,
Committee.

THE

NEW ENGLAND

Journal of Dentistry

AND

Allied Sciences.

Vol. I. JULY, 1882. No. 7.

ORIGINAL COMMUNICATIONS.

RIGHTS AND LIABILITIES OF DENTISTS AT COMMON LAW.

BY JAS. G. DUNNING, L.L. B., OF THE SPRINGFIELD BAR.

The rights and liabilities of dentists in the practice of their profession are to be determined by the same rules that have been laid down for physicians and surgeons, and business experts in general.

A dentist is obliged in each case to apply such diligence as good dentists, acting under similar circumstances, would apply. The simple question is, did he in the particular case exhibit such skill and diligence as good dentists in such cases are accustomed to exhibit? When a man offers himself to the public as a dentist, the law requires that he be possessed of that reasonable degree of learning and skill which is ordinarily possessed by others of his profession who are in good standing as to qualifications. This rule does not require that he should have the highest skill, or largest experience, or most thorough education, equal to the most eminent of the profession of the whole country, but it *does* require that he should not, when uneducated, ignorant and unfitted, palm himself off as a professional man, well qualified, and go on blindly in the duties of the profession.

But a dentist, qualified within this rule, *may* be guilty of negligence and malpractice. The law requires and implies, as a part of the contract, that when a dentist undertakes professional charge of a patient, he will use reasonable and ordinary care and diligence in the case. The law implies that he agrees to use his best skill and judgment, but not that he shall possess the best skill and the best judgment. There is no doubt of the legal right of a dentist to refuse to take charge of a particular case. When in charge, however, he is liable for any negligence, whether of omission or commission, which produces injury to his patient. But a dentist who is acting gratuitously, is liable only for gross negligence. An inexperienced volunteer, who acts when no expert can be obtained, is liable only for gross negligence. But if, by forcing himself into the case, he thereby excludes a competent dentist, his liability is the same as that of such competent dentist. If the practitioner, however, frankly informs his patient of his want of skill, or the patient in some other way is fully aware of it, the latter cannot complain of the lack of that which he knew did not exist. But no recovery can be had in any case where there has been no injury. The implied liability of a dentist retained to treat any particular case extends no further, in the absence of any special agreement, than that he will indemnify his patient against any injurious consequences resulting from his want of proper degree of skill, care, or diligence in the execution of his employment. And in an action against a dentist for negligence, or malpractice, the plaintiff, if he shows no injury resulting from negligence, or the want of due skill in the defendant, will not be entitled even to nominal damages.

If a patient, refusing to adopt the advice and remedies of his dentist, or to follow his directions in any way, thereby frustrates the latter's endeavors, or if he aggravates the case by his misconduct, he cannot charge to the dentist the consequences due to himself. It is the duty of the patient to coöperate with his dentist; and if he will not, or under the pressure of pain cannot, his neglect is his own misfortune.

The rule has been stated to be that a dentist is bound only to exercise ordinary skill and diligence, the *average* of that possessed by the profession as a body, and not of the thoroughly educated only; that is, that he will satisfy the law's requirement if he possess the "average capacity" of the members of his profession. But the true rule seems to be not what the *average* of the profession would do, but what an intelligent, responsible and respectable member of the profession

would do under the same circumstances. The average skill of the profession, taking in good and bad, young and old, as a mass, is hard to reach; and if we count into the aggregate the young who have had no practice, and the old who have retired from practice, the average would give a standard lower than that which should be required. Nor is this the only reason why the test of the "average capacity" is inadequate. In a city there are many means of professional culture inaccessible to the country. In a city new books and appliances can be promptly purchased, and libraries easily visited. In a city also exists that intercourse with prominent professional men which leads not only to keenness and culture, but to the free interchange of new modes of treatment. In the country such opportunities do not exist. What is therefore due diligence and skill in the country is not due diligence and skill in the city; and what is due diligence and skill in the city is not due diligence and skill in the country. Hence, the question of diligence and skill in each particular case is to be determined, not by inquiring what would be the average diligence of the profession, but what would be the diligence of an honest, intelligent, responsible member of the profession in the position in which the defendant was placed.

The following case is reported in the 39th volume of the Maine Reports: Assumpsit for a full set of artificial teeth for the defendant's wife. The contract was made with the wife with the knowledge and consent of defendant. When put into her mouth, she complained that they felt odd and pained her. The plate was then somewhat filed, but she still complained and declined to pay for them. It was agreed that she might take them away and return them on the following Monday, when she returned them and said she knew she never could wear them. Something further was done to the teeth, but she declined to pay for them and left them, although the plaintiff forbade her doing so, and claimed his pay. There was conflicting evidence as to whether the teeth fitted her mouth. By one it was testified that they were a good piece of work, by another that they were a fair average piece of work, and by a third that they were nothing extra. Among other instructions the jury were told that "if the plaintiff had used all the knowledge and skill to which the art had at that time advanced, that would be all required of him." Verdict was for the defendant. Exceptions were taken to the above instructions by plaintiff's counsel, on the ground that they were misleading to the jury as implying that any less degree of skill would not satisfy the require-

ments of the law, and the full court held the above instruction erroneous as tending to hold the standard of professional requirements too high, and a new trial was ordered. In considering this case, the court said: "The highest degree of skill is not to be expected unless stipulated for; nor can it be reasonably required of all. If a dentist has used all the knowledge and skill to which his art had at the time advanced, no doubt that would be all required of him. But could so much be required of him? If it could, then every professional man would be bound to possess the highest attainments, and to exercise the greatest skill in his profession. Such a requirement would be unreasonable."

A plaintiff in an action against a dentist for malpractice must prove that the defendant assumed the character and undertook to act as a dentist without the education, knowledge and skill which entitled him to act in that capacity, or, he is bound to prove that having such education, knowledge and skill, he neglected to apply them with such care and diligence as in his judgment, properly exercised, the case must have appeared to require; in other words, that he neglected the proper treatment from inattention and carelessness.

EXTRACTS FROM MY NOTE BOOK.

BY GEO. L. PARMELE, M. D., D. M. D.

The French have this proverb: "Lie like a dentist"—originating, no doubt, from the fact that in bygone days dentists when asked if a certain operation would hurt, invariably said no. I think that the greatest point in the successful management of children in the dental chair is to so gain their confidence that when you make an assertion they will not mistake you for one of those awful dentists to whom the French proverb refers. If a child is once convinced that you are its friend, and will give it no unnecessary pain, you can do with it as you like.

* * *

In an article on "Bitterns," in the *American Naturalist, Vol. III., p. 176,* it is stated that in the time of Henry VIII. and Edward VI., of England, the long hind claw of the bittern was a most excellent tooth-pick, for, besides its function as such, it had, if the wisdom of our ancestors was infallible, the highly meritorious property of preserving the teeth from decay.

A Chicago man has a woman's tooth grafted into his jaw, and every time he passes a millinery store that tooth fairly aches to drag him up to the window.—*Newspaper clipping.*

***

The mother of one of my patients, eighty years of age, has just cut a dens sapientiœ. A relative of hers, a famous Connecticut poet, now dead, cut the same tooth at about the same age. Another patient tells me, on good authority, that this is also true of one of the early governors of Connecticut.

***

Peter the Great was a man of a very inquiring turn of mind, so much so that in addition to those things which one in his position naturally would investigate, he acquired considerable knowledge in his younger days of such subjects as microscopy, anatomy, architecture, etching, etc. On market days it was his custom to mingle with the people, following their life and studying their trades. At one time he took lessons from a travelling dentist, and experimented upon his servants and suit.

***

The following, related to me last evening by a clergyman, conveys its own moral. A gentleman whose misfortune it was to wear an artificial denture consisting of a full superior set mounted on gold, was visiting friends in the country. Upon retiring for the night he laid the denture on a chair at his bedside. What was his surprise on arising next morning to discover that his plate was missing and nowhere to be found. Notwithstanding his pride as to personal appearance, he was obliged to appear at breakfast "*sans teeth.*" Upon a thorough search being instituted, they were found behind the fire-board in the chimney where they had, in all probability, been conveyed by a rat.

***

Often in old books we get new ideas. The one I quote below is new to me and may be to some others. It is from "*The Art of Preventing the Loss of the Teeth,*" etc., by Joseph Scott, Dentist, London, 1831. "Many persons who object to the operation being performed of grafting or pivoting their decayed teeth, from the fear of pain, or for other reasons, are yet very desirous of appearing to possess good teeth; whilst others, who are sufficiently able to masticate their food with the teeth they possess, exhibit so repulsive an appearance as to induce a similar desire. In order to effect this highly desirable object, I invented the renovator, which is made of the same materials and

possesses all the good qualities of my Artificial Siliceous Pearl Teeth. This renovator is so constructed as to act on the front teeth as a mask does to the face, and gives them all the appearance of health and regularity. It can be slipped on or off in a moment, and adheres perfectly secure without fastening, being made on the principle of precise adaptation to every interstice of the teeth and gums which it embraces. It can be made of any shade of color; is of a delicate appearance, not being thicker than parchment; cannot be distinguished by the most scrutinizing observer from the person's natural teeth," etc.

* * *

Reading of "Ancient American Civilization," in *Scribner's, Vol. V., p. 729,* I found that the ancient Peruvians, judging from the relics found, possessed considerable knowledge of surgery. In this article it says: "It is not uncommon to meet with heads in which the palates, having been destroyed by disease, are replaced with gold ones beautifully executed." I wonder if Dr. Kingsley can tell us if this be true.

* * *

I was present at a meeting of a dental society not long since where, among other business, two members were on trial for breach of the code of ethics. During this trial a reporter of a daily paper was present. Now it seems to me that such trials should be conducted only in the presence of members of the society and be kept as secret as possible, for publishing such proceedings tends to lead the public to look upon the culprit as a martyr, and when one is so considered, it certainly benefits him more than it does those who are supposed to be the cause of his martyrdom. Don't construe this into thinking me opposed to punishment for violation of the code. On the contrary, I desire every society to either live up to or abolish its code of ethics.

* * *

Here is an earlier extract from "*The Birth of Mankinde*, otherwise named *The Woman's Booke*. Set forth in English by *Thomas Raynalde, Phisition*, and by him corrected and augmented—whose contenents yee may reade in the table followyng, but most playnely in the prologue:

Imprinted at London by Richarde Watkins.
Cum Privilegio, 1568—
(Black Letter)

To keepe and preserve the teeth cleane:

First, if they be very yellow and filthie, or blackish, let a Barber

scour, rub and pick them cleane, it shalbe very good to rub them every day with the root of a mallow, and to pick them cleane that no meate remayne and putrifie between the teeth.

Item, take of the small white pibble stones which be found by the water sydes, and beate them in very small powder. Hereof take an ounze, and of masticke one dram, mingle them togeather, and with this powder once in X days rub exactly your teeth, and this shall keepe your teeth fayre and white; but beware yee touch not ne vexe the gummes therewithall.

Item, to stable and steadfast the teeth, and to keep the gummes in good case, it shall be very good every day in the morning to wash well the mouth with red wine.

RUBBER-CORUNDUM DISKS, WHEELS AND POINTS.

BY JOHN G. HARPER, D. D. S., ST. LOUIS.

On January 20, 1880, I read a paper before the St. Louis Dental Society, describing my mode of making separating disks, and as I know of a number of dentists who think these disks are superior to any, I take the trouble to copy from the Missouri Dental Journal, Vol. XII., page 77, and make a few additions.

. . . .

I will now proceed to give my method of mixing the materials and forming the different instruments. You will find Whalebone or English black rubber the best, as they are softer and more adhesive, when heated to the proper temperature, than other brands. Corundum powder, No. 80, is a good size to use. . . . The only tools needed are a marble slab and a round bottle. First heat the slab to about 180 degrees F. Place the heated slab upon a table, and spread upon it a small quantity of powdered corundum, say half an ounce; extend over a surface as great as that of the rubber into which you wish to incorporate the powder; cut from the end of a sheet of rubber a strip half an inch wide, and place upon the powder, which is now heated by the slab; roll the mass with the bottle, turning the rubber from time to time, until the area of the rubber is twice as great as the original; double the piece so as to bring the powder into the interior, then roll out until the thickness is about No. 20 of the U. S. gauge plate. This mass will be sufficient to make half a dozen disks of thickness No. 23, U. S. gauge plate, and seven-eighths of an inch in

diameter. The powder should be worked in until the mass is three times the weight of the rubber used.

If you have no marble slab the following method may be resorted to: Heat the rubber the same as in packing a case, first cutting the strips the size just described, and laying half a dozen, more or less, on your heating apparatus. A sheet of tin laid on your table, and the corundum powder spread on it, will take the place of the marble slab. When the rubber is sufficiently heated, take up one strip, place on the powder and quickly roll it two or three times with the round bottle; turn over the strip and roll the same as at first. By this time it will need reheating. Replace in the position from which it was taken, and treat the next piece in similar manner, going through the pieces consecutively about three times. If you are not able to roll the rubber thin enough, it can, at the proper temperature, be stretched to the desired thinness. A little practice will soon make you an expert at mixing the materials.

The mass is ready at this stage for packing. The next thing is to make the proper mould. A permanent mould may be made of brass, as the vulcanized disk can be removed from brass. If iron is used, it is necessary to first line the mould with heavy tin foil. If too thin foil is used, it (the foil) cannot be removed easily. The most simple way is to vulcanize the rubber-corundum in sheets between two pieces of smooth glass, which may be properly packed in a rubber flask, so that in separating a piece will remain in each part. The glasses may be kept the required space apart by placing between them pieces of sheet tin or brass of the same thickness as is desired in the disks. Cut, with a pair of shears, a circular sheet of the prepared rubber, equal in diameter to the disk you wish to make; in the center of this place a circular piece of *fine brass gauze* one-third the diameter of the disk. This and as many more as the space will permit are placed between the glasses in the flask and closed in the usual way. Vulcanize, and let cool gradually. The wire gauze can easily be seen in the vulcanized rubber. In the center of it punch a hole. Lay a model disk, which may be turned from sheet zinc or brass, upon the sheet of corundum-rubber, so that the holes come together, through which pass a mandrel to hold in position, and then cut out the disk with an old pair of shears. Mount the incomplete disk on a parting-nut mandrel, and place in the dental engine or laboratory lathe and turn circular by holding against the rapidly revolving disk a piece of very coarse sand-paper.

Wheels, cones and points of any desired form may be made by first making a model of plaster of Paris on a mandrel and getting an impression in two parts by pressing the model one-half its size into soft plaster contained in the lower half of a rubber flask. After the plaster hardens, trim and soap or varnish, and fill the upper part in the usual manner. As the models have been mounted, the mandrels are not removed, but the whole invested. Open the flask and remove the model; pack with the rubber-corundum, vulcanize as usual. Fine polishing points may be made by using *pulverized pumice stone* instead of corundum.

The disks cut better if run very rapidly and kept wet, using but little pressure. When through using a disk, remove from engine and put in a place of safety, as more disks are broken carelessly when not in use than any other way. Small pencil-like points can be used in many cavities, making better margins than can be secured in any other manner.

SELECTIONS AND ABSTRACTS.

VACANCIES IN THE DENTAL ARCH.

BY W. C. WARDLAW.

A single gap in the dental arch is often the fruitful cause of many evils. Chewing upon the opposite side of the mouth is, perhaps, the most common and greatest evil consequent upon one such vacancy. Where there are several, occasioning a positive difficulty in the proper comminution of the food, by reason of the want of sufficient articulation of masticating surfaces, then dyspepsia, with all its train of ills, is apt to follow. I know of no minor(?) operation in dentistry from which more comfort and utility is to be derived, than the filling of these breaks in the continuity of the arch, and that dentist who devises the simplest and most feasible method of doing this, will be a public benefactor and a humanitarian.

. . . .

It certainly is practical to fill the vacancy caused by the loss of one, two, and perhaps three teeth, by securing, through plugging, to the adjoining teeth, a bar of gold, to which has been attached by soldering, a porcelain crown or crowns. The crown can be so nicely

adjusted to the gum as to look well and natural, and if properly done, will be very stable and durable. It is a *nice* operation, and requires care and forethought, as well as skill and taste.

. . . .

I take, as my illustration of the crown to be supplied, the left upper first bicuspid. First, give attention to the formation of the cavities, which are to be prepared with more than usual care. They are supposed to be in the approximal surfaces of the canine and second bicuspid, and if no cavity of decay already exists, artificial mortises, or slots, will have to be cut in these positions. The thorough preparation of the cavities, and the taking of an accurate impression in plaster—not wax—of the parts, may be enough for one sitting, for both patient and operator. The entire operation would be too tedious, and this is a good half-way stopping place. Therefore fill the cavities temporarily with gutta-percha, or oxyphosphate, and dismiss the patient. From the impression, obtain a correct plaster model, upon which a large proportion of the work can be done without the necessity of the presence of the patient.

Having next carefully selected a crown—a cuspid crown would likely suit best—of proper shade, and ground to fit the gum nicely, solder on a gold backing. The backing may be prolonged a fourth of an inch, to rest upon the inside of the alveolar ridge. This may readily be done by bending with the pliers, but will be done more satisfactorily, and really easier, by swaging up a small saddle to bestride the ridge, and to which the crown is to be soldered. This increased base not only adds greatly to the stability and permanency of the operation, but assists materially in steadying the crown and in keeping it in proper position during the operation of anchoring the cross-bar.

The next step is to make and attach to the backing of the crown a gold cross-bar of sufficient strength. This should be as long as the cavities in the teeth will allow, and should be so arranged relative to them that it will be supported on both sides, edges and ends, by the gold filling. Having so arranged all this by aid of the model, the two are to be soldered together, and all the crevices to be filled with solder or foil.

When the patient returns, the operation is to be resumed by preparations for keeping the cavities dry whilst they are being filled. For this purpose, I have used the wax ligature, passed twice around the tooth, but I find the rubber-dam better. It is not well to include

both teeth in the same piece of rubber, for it is apt either to fold bunglingly in the way, or to exert a traction upon the crown so as to disturb its close adaptation to the gum. Begin, therefore, with the second bicuspid, and taking a small piece of rubber, cut a hole as near the edge—say one thirty-second of an inch—as will secure immunity from moisture. Use annealed foil, and anchor well the filling at the cervical wall, and build down squarely to where the upper edge of the bar will have to rest. Now comes the particular part of the operation—the filling of the space between the buccal wall of the cavity and the bar in position. For it must be remembered that it cannot be done well, and properly finished up, after the crown is anchored in place. Put the crown in place and fill the space between the bar and the palatine wall of the cavity with quick-setting oxyphospate cement, and when it hardens, remove the crown. Slip in alongside the cement a matrix of wood or gold plate of the thickness of the bar, and continue to build down the filling in the cavity thus formed to the point to which the lower edge of the bar will come. Now carefully trim off, finish up and burnish with files, polishing tape, etc., so much of the filling as is inserted. Pursue the same course and proceed to the same point with the cavity in the canine, and remove the cement fillings. And now for the last time, the crown is to be replaced, when it will be found that the bar will slip easily into place, maintained accurately in position by resting against the partially inserted fillings. The remainder is plain sailing. There will be no trouble in holding the crown in place with one hand and solidly filling the two simple cavities (easy of access from the palatine aspect) left between the bar and the palatine wall of the cavity, and thus the crown is immovably anchored in the two solid fillings surrounding the bar. The dressing off of the gold upon the palatine aspect is all that is left to be done, and is a simple matter, the access being easy.

And now you will hear your patient say, "Doctor, that is so nice—feels so firm and natural. No one can detect it. I would four times rather have it than a plate."

As to the cost of such an operation; some people like to know the "cost" of things. The price should be somewhat "fancy," at least remunerative; for it is a *nice* operation, requiring the judgment, taste and skill not possessed by a second-class operator. A fair price, I think, would be the usual charge for two gold fillings and a single tooth upon a rubber plate.

A little reflection will enable one to modify these manipulations so as to meet the peculiar requirements of particular cases.

In conclusion, I would add that I think there are great possibilities involved in this principle, and I believe that the more it is practiced the greater it will extend the range of dentistry, particularly in the direction of increased masticatory powers.—*Southern Dental Journal.*

KOCH'S DISCOVERY IN TURERCULAR DISEASE.

Dr. Koch, Government Adviser of the Imperial Health Department of Berlin, has lately published a series of results of investigations into the etiology of infective disorders; the last in the form of an address read before the Berlin Physiological Society, on the "Etiology of Tubercular Disease." In this he claims to have discovered *bacilli*, parasites which infest tuberculous patients. Prior to his experiments it has been established beyond doubt that tubercular disease was communicable, but the nature of the contagion was still a mystery. This discovery is one of great importance, for though no practical result can yet be derived from it that can materially alter the treatment of this disease, further investigation will no doubt throw more light on the subject. We give a condensed account of some of his experiments, taken from a letter by Prof. John Tyndall to the *London Daily Times:*

"Permit me to give a further, though still brief and sketchy account of Koch's experiments. Of six guinea-pigs, all in good health, four were inoculated with bacilli derived originally from a human lung, which in fifty-four days had produced five successive generations. Two of the six animals were not infected. In every one of the infected cases, the guinea-pig sickened and lost flesh. After thirty-two days one of them died, and after thirty-five days the remaining five were killed and examined. In the guinea-pig that died, and in the three remaining infected ones, strongly pronounced tubercular disease had set in. Spleen, liver and lungs were found filled with tubercles; while in the two uninfected animals no trace of the disease was observed. In a second experiment, six out of eight guinea-pigs were inoculated with cultivated bacilli, derived originally from the tuberculous lung of a monkey, bred and rebred for ninety-five days, until eight generations had been produced. Every one of these animals was attacked, while the two uninfected guinea-pigs remained perfectly healthy. Similar experiments were made with cats, rabbits, rats, mice and other animals, and, without exception, it was found

that the injection of the parasite into the animal system was followed by decided and, in most cases, virulent tubercular disease.

In the cases thus far mentioned, inoculation has been effected in the abdomen. The place of inoculation was afterward changed to the aqueous humor of the eye. Three rabbits received each a speck of bacillus-culture, derived originally from a human lung affected with pneumonia. Eighty-nine days had been devoted to the culture of the organism. The infected rabbits rapidly lost flesh, and after twenty-five days were killed and examined. The lungs of every one of them were found charged with tubercles. Of three other rabbits, one received an injection of pure blood-serum in the aqueous humor of the eye, while the other two were infected in a similar way with the same serum containing bacilli derived originally from a diseased lung, and subjected to ninety-one days' cultivation. After twenty-eight days the rabbits were killed. The one which had received an injection of pure serum was found perfectly healthy, while the lungs of the two others were found overspread with tubercles."

In the same letter Prof. Tyndall calls attention to the fact that in no other way than by experiments upon animals could this valuable discovery have been made, and regrets that the "noisy fanaticism" of conservatives, by making vivisection punishable in England, has debarred English scientists from making further investigations into this great, vital subject. Dr. Koch has already made himself well known by his investigations into the nature of splenic fever, which were marked by so much thoroughness and skill.—*The Medical Register.*

Stockings with toes have always been used more or less in treating foot troubles, but in England they have lately come into more general use, and are considered a sure preventive of many diseases which make a walker's life wretched. The London Lancet favors such stockings as likely to be comfortable and spare serious trouble to persons who suffer from soft corns between the toes. The Lancet says: They will, moreover, give the foot better play, allowing its phalanges greater freedom of action; and, lastly, a well-fitted digitated sock or stocking will remove a mass of material from the toe of the boot, and, at the same time, secure increased breadth and space for expansion across the base of the toes. The new stockings, supposing them to be well cut and fitted, possess many advantages. Even if the toed stocking should have no other effect than to expel the ugly and unphysiological "French-toed" boot, it would prove a public benefit.

EDITORIAL.

Why, how "tall" you are, *Item of Interest!* We always liked rather to be in the company of tall people than of small ones.

The failure of the recent "Dentistry Bill" to become a law of Massachusetts, by reason of an executive veto, suggested to us the desirability of knowing just what the legal status of the profession is in States having no special legislative enactments. Those who are interested will find in this number a carefully written article on "*The Rights and Liabilities of Dentists at Common Law*," by a member of the Springfield Bar, which is alike applicable to all States, modified only by such *special* laws as any State may have adopted. It is worthy of a careful reading, and *may* come handy for reference.

We learn with sincere regret that Dr. Marshall H. Webb, of Lancaster, Pa., has been suffering with a painful and serious illness for the past twenty weeks, and that he is still confined to his bed, uncertain as to what the result may be. Dr. Webb has greatly endeared himself to the entire profession, not only in the United States but wherever dentistry has felt the influence of these progressive times. That he is now a sufferer by reason of his long-continued, self-sacrificing and earnest devotion to the advancement of the profession, can hardly be doubted; and a knowledge of which fact serves to more sharply pull at the heart-strings and excite the tenderest sympathy of all who know him. There is, and can be, but one wish and prayer, and that is that he may speedily find relief and resume his prominent place among us.

The dental profession will regret to learn that, owing to the pressing duties of his office practice, Dr. L. D. Shepard, of Boston, feels compelled to sever his connection with Harvard College as Professor of Operative Dentistry. We understand that his resignation has already been tendered to take effect at the close of the current year. Dr. Shepard has been identified with the school as adjunct professor and professor ever since the dental department was first instituted in

1867, and a large share of the credit for the good work achieved, and the enviable name won for the Harvard school, rightfully belongs to him. To have so long held one of the most important positions among those who have so successfully labored to establish this school upon a basis that would, by its own merits, command the respect and admiration of the whole dental world, and place it upon an eminence at least second to none, must be a compensation that will to a considerable extent repay the constant devotion and earnest work that Prof. Shepard has so unsparingly given it.

RAMBLINGS AMONG THE JOURNALS.

The *Ohio State Journal* of April contains, as leading articles, two copies from the Illinois State Dental Society report—one on Operative Dentistry, by Dr. Geo. S. Miles, and the other by Dr. C. A. Kitchen, both able articles. The editor of the Ohio Journal "goes for" Dr. Spalding and his article on Rapid Decay, which we, too, published in our April number. Dr. Watts says nitric acid, of course in the nascent state, produces white decay, and he refers to his article on ammonia in the February number. When we first read this article we did not think it necessary to criticise the chemical views of the author, given in this article, because they were partly antiquated; but we have read the article again and find a few statements which should not be allowed to pass unnoticed. This article on ammonia opens with a few general, highly doubtful sentences: "The chief bulk of vegetable bodies is made up of carbon, oxygen and hydrogen; that of animal bodies includes these and also nitrogen." This general statement may stand as it is, but it is fraught with the danger of a sophism, as if in vegetable bodies the nitrogen was not to play an important part. Quite the contrary; without nitrogen there is no vegetable body grown in nature; while the bulk of many animals, like the ascidiæ, consists of as high a percentage of "vegetable" substances as that of any plant. The whole distinction ought to be abandoned by scientific writers. That "putrefaction is the process of decomposition of azotized bodies, and fermentation that of non-azotized substances," is again a general statement without sufficient basis. That the exciting cause of both is oxygen—at least in its free state—is again wrong. When sugar ferments no kind of oxydation takes place; nothing is added; it gives just its weight of alcohol and carbonic acid, hence, no oxygen comes into play. All these general statements of Dr. Watts are fictitious.

"The ordinary state of hydrogen is gaseous, which is not favorable to chemical combinations," is again such a general, doubtful statement. The process of putrefaction never before has been explained in the way it is done in his article, as if oxygen was needed; by no means. Putrefaction goes on in an atmosphere of carbonic acid if the proper organisms get access to the nitrogeneous compounds. Then a chemist and "vital force!" "Molecules discharge their functional duties in obedience to vital force," is a startling sentence. That molecules have "duties" we never knew before; then "in obedience to vital force!" We are glad that they are obedient in these days of general wickedness! But the grandest sentence is the one following: "And die (the molecules) from the effort, after which they are obedient solely to chemical force." (!) That molecules can die is the grandest (?) conception in chemistry we ever met with. Do many believe that? Dr. Watts seems to think that it is the ammonia in growing girls that prompts their strange habits of drinking vinegar. Now, as he says, page 70: "Bearing in mind that ammonia is the result of putrefaction of dead or effete nitrogeneous tissue," we have to suppose in the *growing* girl more dead nitrogeneous tissue than in the full-grown woman. How is it possible that during the period of growing the dead tissue can be more abundant than during the period of full development? The ammonia theory seems to us as faulty as any theory can be. Nitrogeneous tissue in contact with oxygen, nitrogen, or in fact any gas *free from certain organisms*, may they be called bacteria, or vibriones, or anything else, does not decompose into ammonia, at least, not at temperatures lower than 120 degrees Fahrenheit. The chief azotized decomposition produced of nitrogeneous substances, in contact with insufficient absorbed oxygen in the body, is urea, not ammonia. To suppose that the urea has at one time been cyanate of ammonia, and that this is transformed into urea, would rather complicate than simplify the theory, because many conditions are lacking under which we know cyanate of ammonia to be formed and transformed into urea. The amount of nitrogen converted into ammonia in the body is so very small that, in spite of the alkalicity of the blood, which would favor its elimination, many observers have been unable to measure its quantity in breath; further, the amount of ammonia in fresh urine is immeasurably small when compared with the other azotized constituents of urine; then, albuminous substances in the body do not undergo ammoniacal decomposition unless certain lower organisms are present, or already decomposing albumen is brought

in contact with it; furthermore, ammonia can be breathed with impunity, in quantities many hundred times larger than there is in the breath under any condition, except bronchiectasis, without any constitutional effect at all. Then, when ammonia salts are fed to animals, or given, as it used to be very general, in cases of bronchitis, but a small amount appears in the urine or breath; the greater part disappears, probably by forming bile compounds. Yet the blood is alkaline, due to carbonate of soda, and would set free ammonia very easily at the temperature of the blood. Therefore, to consider ammonia as a source of great trouble in the body, does not seem to us warranted by anything we know about this compound. After all, Dr. Spalding's theories, or rather suggestions, look to us far more plausible than Dr. Watts' ammonia theory.

Dental Office and Laboratory: It appears as its fifth volume, published by Johnson & Lund, 620 Race street, Philadelphia. It is a quarterly, with a good deal of advertising. The first page of the January, 1882, number contains a report of the meeting of the Pennsylvania Odontological Society, in November, 1881. Watts' Crystal Gold was the subject of the evening, and was spoken of very highly by all who had used it. A second long paper, by W. S. Bonwill, D. D. S., on the Salvation of the Human Teeth: How shall it be Done? speaks of the "capillary tube" as pretty nigh essential for decay. The theory of this "capillary tube" seems to us defective, because we know many instances with perfectly separate teeth without that capillary tube where proximal cavities exist more abundantly; besides, decay occurs in the upper jaw, where the capillary tube does not come into play. Does such artificial grinding out of peculiar spaces between the teeth really save them any more, or does it only save them indirectly by allowing the filling to be put into the proximal cavities better and tighter?

The *New England Medical Monthly* of April, 1882, is so full of excellent reading matter that we hardly know where to commence commenting. The first communication is by William A. Hammond, M. D., the celebrated New York doctor of nervous and mental diseases, on Incontinence of Urine as a Preätaxic Sign of Locomotor Ataxia. He cites a very interesting case where this incontinence of urine existed a long time without the patellar tendon reflex showing any sign of alteration; later, this symptom supervened. Dr. S. T. Delamater, of Bridgeport, Conn., publishes an account of removal of scirrhus under the influence of ether, followed by death through hem-

orrhage from the lungs. Can this death be attributed to ether? The young man who died, in this case, had suffered from hemorrhage of the lungs for weeks previous, but the parents had kept this fact secret, fearing the doctor would not perform the operation. (!) Who was to blame?

Some bad effects following the use of iodoform are mentioned. In one case it had been used in an operation of the elbow joint, where about one-quarter of a pound was packed into the wound. The symptoms were first excitement and deliriousness, afterwards a remarkable indifference, the patient staying in bed, with his eyes wide open—in fact, with most of the appearances of tubercular meningitis. He died on the fifth day after the operation in deep coma; no anomaly was found on post-mortem; removal of the dressing failed to give any relief. The amount of urine was diminished, but it contained great quantities of iodides.

One of the brightest dental monthlies is doubtless the *Missouri Dental Journal*—not the least so its number of April, 1882. The first article is on the Characteristics of Saliva in Syphilitics, by Dr. A. W. Harlan, of Chicago. He urges every doctor, and chiefly dentist, to be exceedingly careful with all their instruments. Three and one-half per cent. of the cases of syphilis appear first in the mouths of the infected persons. That "lobing of the tongue in syphilis is generally due to mercury," and not to syphilis, as Dr. Harlan writes it, is, we are forced to think, to be ascribed to the mercurophoby, of which they seem to suffer considerably "out West." The treatment shows the same slight mental indisposition; the whole local treatment of syphilis is not only well-nigh worthless, but even dangerous, because it retards the only thing to be done—to give the patient a good sound treatment with mercury or iodides; but we know, doctor, that about mercury the best men disagree.

In its Foreign Department the *Journal* gives two very interesting articles from the *Deutsche Vierteljahresschrift*, one on a half-liquid root-filling, the other on iodoform in teeth.

From the *Scientific American* a report is copied about experiments made by Berlin chemists, who carefully examined the volatility of mercury when combined with other metals. They find that gold, silver, copper, bismuth, lead, tin, zinc, and cadmium, lose their mercury entirely, or nearly so, at or under the boiling point of mercury; while only the amalgams with sodium and potassium retain their mercury with a certain persistency, which indicates chemical combination.

These experiments are somewhat in variance with those of others, also quite good chemists, who found that platinum and silver retain mercury, at least small quantities of it, at temperatures of 700–800 degrees C., or 1300 F. Who is right, and where lies the discrepancy? But fortunately the temperature of the mouth does not approach so very much the boiling point of mercury (about 670 degrees F.), that the danger of mercurial poisoning is greatly increased since those experiments. This for Dr. Talbot and his roaches; he might otherwise right away draw the consequences, that, because mercury boils at 670 degrees F., it is dangerous to have your neighbor wear an amalgam; for what a powerful dilution of mercury vapor would there be from the breath of this neighbor into the surrounding air, and from thence into our system; a most powerful decillionth dilution!

Missouri Dental Journal of May, 1882. The first article is: What is Facial Neuralgia? by Parsons Shaw, D. D. S., Manchester, England. The article is based on the case of a patient who died from too many doctors. It was a great abscess of the antrum, which the dentist had diagnosticated rightly, but the doctors, who always "knew all about it," made out quite a beautiful case of Bright's disease, gout, neuralgia, etc., while it was nothing but pyæmia, caused by absorption of pus from the antrum. The case is very illustrative as showing that the service of a dental specialist in facial neuralgia is in many cases of more service than that of a doctor, who is "*dignus entrare in hoc docto corpore*," as Moliére berates the physicians of his time with ridiculously bad Latin.

Dental Hygiene is the next article, by Dr. D. P. Richards, of Elgin, Ill. Every sentence forms a paragraph. Some of the sentences are quite good, but we must heartily disagree with what is said about acids in the mouth. Dr. Richards says: "The chemical, or acid theory, is now almost universally accepted by our profession as a directly exciting cause of decay." In spite of that universality (?) of acceptance to the acid theory, we dare to consider it most beautifully faulty—just in this number we give somewhat our own views; they may be very wrong, but they fit remarkably well to the chemical, microscopical and physiological discoveries of the last ten years. The great effect of tooth-brushing may be doubted from the fact that negroes in Africa, Esquimaux in the North, and animals of almost any kind, have excellent teeth, yet the trade in tooth-brushes with these beings is said to be quite small. Cleanliness may do something, and a great deal, but not all; far better than any tooth-brush is healthy parents, with fine teeth. A very lengthy discussion followed.

The *Dental Luminary* is the title of a rose-colored quarterly issued at Macon, Georgia. It is an advertising sheet, but, to be fair, it contains many able articles. Its April number of 1882 opens with a paper by G. W. Rembert, D. D. S., Natchez, Miss., on Operative Dentistry. He adopts the "new departure," as he calls the reaction against gold, as the only allowable filling of a tooth. His ideas are very good and practical. The proceedings of the Mississippi State Dental Association are reported. The chief subject of discussion seems to have been the consideration of a bill for the Legislature of the State to regulate dentistry. The quarterly contains an article on Operative Dentistry, by A. H. Hilzhelm, of Jackson, Miss., and a very able article by Duff Post, Tampa, Florida, on Conservatism in Dentistry.

Another rose-colored dental quarterly is the *Dental Record*, published at Baltimore, Maryland. Its April number of 1882 contains a good popular article on sleep.

The *Dental Cosmos* of May, 1882. contains an answer by Dr. Wilbur F. Litch to our esteemed writer of the Ramblings. Now, we know him pretty well and are sure that he knows well what he says. We therefore thought it proper that he would answer strongly, but his answer disappoints our expectations of a literary circus. He says: "First, the subject is altogether too special to be of much interest to the dental profession at large; certainly not one dentist in one hundred will see the exact point of the dispute. I, therefore, rather would have the appearance created of being crushed or otherwise annihilated than of having our Journal dull or abstruse; perhaps I should not have touched at all this theoretical point. I maintain both statements, with the modification that in the first passage I should have explained a little more explicitly the decomposition of the tooth by the hydriodic acid. As to the second passage, I beg leave to consider that the pulp-chamber is dark, and that one very essential point for the decomposition of HI is light. Then Dr. Litch should not crush me so badly, with general book statements which may be useful for one who studies for the first time on the school-bench something about iodine, but which in their general applicability are not applicable to special cases. I know those statements by heart, I might say, since 1864, but they never have helped me in any special case. The only way to test a special case is experiment, and a proper explanation of the experiment. These general statements are like: 'Gold is found in Africa.' It is true in general, yet I would not ad-

vise Dr. Litch to land at Boriboola-Gha with a big box and to expect to have it filled within the first hour with 'gold found in Africa.' We do not deny the value of the application of iodine, yet the theory of Dr. W. Litch is erroneous in his practical special application, not because it contains any statements that are not true in a general way. I published in the same number a long article on creasote and carbolic acid. I repeat that creasote is only an impure, commercial article, while carbolic acid is a distinct chemical compound always present in commercial creasote. Dr. Litch seems to have entirely misunderstood my position because he supposes me to imply that creasote and carbolic acid are indentical. Please, Doctor, to read that article on page 97 of our Journal!" Thus far our rambling man. We need not add any commentary.

Who would like to criticise that fine book, "Quiz Questions," by Dr. J. F. Flagg, of Philadelphia? Though the job tickles us "awfully," we would like to have somebody else do it. Did he really say such things? In the first place, we would like to know if the book represents approximately anything like the views of the excellent professor. We hardly can believe it; there are more empty words in that book than we ever read in any treatise on Swedenborgianism or in an art criticism. Is the book a serious publication or a good practical joke? If serious, nothing better can be done than sound "pummeling;" but we hope it is nothing but a joke of a dental wag!

There are people who suppose a chemist exceedingly unpractical; they think such a chemist knows lots of things, but does not know how to make any use of them. "Let us try and get out of him something for *me!*" With such an idea, a Yankee not very long ago called on us. "You are a chemist, are you not?" "Yes, sir, I believe I am." "You have a nice laboratory; those are fine scales, I suppose. By the way, could you make me a solution of coke—you know, gas-coke; I would like a small bottle, with a recipe how to make it." Poor fellow! He thought we were innocence, while "it was him." We were sorry to tell him that all his money could not pay us for that small bottle full of this solution. He only thought it might give a mighty good varnish for all kind of things. So we thought, too, and a good deal more.

How singular it is that scientists, particularly those engaged or interested in histological research, should make dogmatic statements in regard to subjects not clearly understood, or sufficiently comprehended to warrant any opinion in the direction they may be given. We have noticed this peculiarity in those who deplored by word and pen the same characteristic in others, and yet never considered the trait in themselves as at all inconsistent. We are reminded of this by the recent researches into the histology of the dental pulp, by Dr. Bödecker, wherein the blood vessels are found to be arterial and veinous in character—no one ever doubting a capillary system present in the pulp. A few months ago we were examining dental pulp tissue, and prepared it in different ways for examination. One method was by hardening it in one per cent. aqueous solution of chromic acid, separated from the dentine; another method was in the same solution in situ with dentine; still another method was to take the fresh pulp from the extracted tooth, immediately stain with carmine and harden in strongest glycerine, to which was added one per cent. acetic acid—the pulps left in this from three to six months, and sections obtained with a *very keen razor*. All of these specimens showed blood-vessels; longitudinal sections showing *symmetrical* arrangement in outline and transverse sections plainly showing the *tubular* characteristic of *double* or *triple* coated vessels. Well, we had heard from certain quarters repeated assertions that no such vessels were to be found in the dental pulp. So we wrote to headquarters for affirmation of the statement and it came "dogmatically that neither an artery nor vein were to be found in a normal human dental pulp." We were not convinced, because a study of true capillaries from photographs by that earnest and honest U. S. army surgeon, Dr. J. J Woodward, revealed to us that we had not called attention to these results. But the truth will survive, and lovers of it cannot be too careful of their statements upon subjects that are not well apprehended.

TOOTHACHE.—Dr. Spörer recommends that three to four crystals of hydrate chloral should be inserted into the hollow and painful tooth, the chloral being allowed to dissolve. He has treated thirty-eight cases successfully in this way, and has also obtained good results in several cases of hemicrania resulting from carious teeth.—*Chemists' and Druggists' Bulletin.*

Operating Table and Laboratory.

Mr. Editor:

Dear Sir—While I do not quite agree in all you say in regard to rubber and celluloid plates as compared with gold, platina, or silver, I fully agree with you that the above-named metals would be more conducive to the health of the mouth if the plates from such metals were well made; but, as a rule, they are not. The greatest advantage to be gained from the use of metal plates over rubber or celluloid is coolness to all parts of the mouth covered by the plate; but I cannot see that a rubber plate, lined with any of the metals, would possess any advantage over an all rubber plate as far as coolness is concerned, or conductivity, for the reason that the rubber would cover the outer surface and prevent the real object for which the all metal plate is recommended.

The cleanest, coolest and most desirable plate I have seen is an all gold base plate, with the teeth attached to the plate with the best quality of rubber, using no more rubber than is necessary for strength. The lining of a rubber or celluloid plate on the gum surface would not, from my observation, add much to the *sweetness* of a plate kept in a *filthy condition*. I have examined mouths where rubber plates have been used for fifteen or more years, and found them looking as well and healthy as if a gold plate had been used; but the plate was kept *clean*, and was *removed* from the mouth every night on retiring, and placed in water. If you will insist on your patients doing this, you will in a great measure avoid the "hot, peppery condition of mouths"—a condition which I have seen where all gold plates were used, but kept in a filthy condition, and worn constantly, night and day. So it is not best to lay all the cussedness at the door of rubber or celluloid. If you wish to try the lining of a rubber plate with platina. you can, I think, obtain the plate of Mr. H. M. Rayner, 25 Bond street, New York. Just how thick it is used, I am not able to say, as I have never used any; but, from my examination of the case referred to, should say that No. 35 or 36 plate gauge was about the thickness. It should be thin enough to burnish on the plaster model in nearly the same manner as with tin foil, and the surface that is to adhere to the rubber is in some way made rough, so that it will be firmly attached to it.

You understand that since the introduction of the rubber dam as

an assistant in operations on the teeth, most new dentists, and not a few of the old, are in the habit of using it on all occasions—no matter, much, how slight the operation—*they make it a hobby*, and often to the inconvenience of their patients. Now I wish to ask if you have ever tried using *small* napkins properly folded and held in position by a suitable rubber dam clamp, as a means of keeping your work dry in ordinary operations? If not, it will pay you to give it a little thought. E.

In reply to the above we would say, that it is of the first importance in the construction of dentures to select for the base plate a material with the least possible objectionable features, and afterward to construct a denture which will manifest artistic skill. When we speak of *gold* in this connection, we do not refer to 14*k*, or 16*k*, but to gold of a degree of fineness consistent for the purpose—probably not less in any case than 20*k*. Surely we ought not to expect very good results from plates which are not what they purport to be; and, without doubt, plates have been made and called gold, in which silver and copper were the chief elements. However, if this *alloy* is better for the mouth, let us prove the same and act accordingly. So far as cleanliness is concerned, it would hardly seem possible that a plate so readily tarnishing as a 16*k* proves to be, could as easily be kept free from extraneous matter as one of greater purity.

If as a profession we thought less of our own ease, and strove more earnestly to influence our patients to have that done for them which would be for their *permanent* good, we might after all find more comfort, and certainly we would have a clean conscience to cheer us on the way.

Is it not a fact that our desire for ease and the securing of an office boy (under the name of "student," but virtually to learn nothing but to keep the office clean and finish up a rubber or celluloid plate) has wrought us great evil? Is it not to this condition, and nothing else, that we, to-day, see so many young men who prefer to be "cheap Johns" in *rubber* and *celluloïd*, rather than to be at the necessary expense and time to become expert *plate* workers. No dentist is fit to employ a student who is not competent and willing to do all he can to make that student in time an honor to the profession; and just so long as "students" are made to do dirty work and be taught nothing, we shall pray for legislative enactments to drive out of our ranks—whom? Why, men that we have *educated* (*?*).

We venture to say that no young man who is worthy to be accepted as a student, and is looked after for three years as a student should be, will ever disgrace himself or his preceptor in this manner.

We rejoice that at the present time so much thought is being given to the influence of dental plates on the local parts as well as on the general health, and we trust that the next twenty-five years may see—what the same length of time in the past has not seen—some improvement in this department of dentistry.

INJURIOUS EFFECT OF VULCANIZED RUBBER.

Among the objectionable features in the use of vulcanized rubber in the mouth, one of the most objectionable is the least referred to, namely, the *constant absorption of bony structure* resulting therefrom. It cannot be that this effect is overlooked by dentists generally. Can it be that it is ignored for prudential reasons? Doubtless a majority of those who commenced practice since the introduction of rubber are not sufficiently familiar with the use of metal plates to have noticed the difference in their effect. Nevertheless, it is true that *vulcanized rubber* (and I think *celluloid* too) *is producing incalculable injury to the mouths of those who wear it.*

Thirty-two years' experience, exclusively in mechanical dentistry, has given me ample opportunity to satisfy myself as to the correctness of this statement. The case is plain and can be readily understood by the patient, and instead of universal recommendation of this material for permanent work, a statement of its nature should be made so that the patient can have a choice in the matter, and not be led to think that it is not only a good material, but really the best for artificial dentures. These vegetable bases are *non-conductors of heat*, and it is to the undue retention of heat in the mucous membrane, combined with pressure, that the absorbents are unduly stimulated, resulting in a constant loss of bony tissue. Now for the proof of this assertion, I have never seen a mouth where a rubber plate had been worn for five years and upward but there was manifestly an undue absorption of bone—in the upper jaw, to such an extent, that often there is nothing left but a flabby ridge, and in the lower jaw very often a total disappearance of ridge, and sometimes a depression.

I do not deny that *sometimes* there is undue absorption when wearing metal plates, but those are the *exceptions*, and not the *rule* as in the other case, and arising generally from undue pressure, long con-

tinued at one point or to some peculiar idiosyncrasy or constitutional taint. This fact was emphasized in my own mind more fully upon a recent visit to Boston, where I saw various mouths wearing plates of gold and continuous-gum, which I made 22 to 24 years ago. In every instance, lower as well as upper, the gums showed little additional absorption, and were hard and healthy. I am constantly investigating mouths for the purpose of witnessing the relative effects of rubber and metal plates, and am more and more impressed with the great injury being done to mouths in this way. And it is really a serious matter to the individuals who are doomed to wear artificial teeth the rest of their lives, for they cannot fail to appreciate the fact that the better and more permanent the condition of the gums, the better will they be enabled to successfully and comfortably use their teeth. And so, as I have said, let patients know the real facts in the case, and then if they choose the cheap base, *base as it is*, the worse is their own.—L. P. HASKELL, Chicago, Ill.

However many evils may have resulted from the use of celluloid plates, we can think of it in one regard, at least, with gratitude and that is, that through this medium we were educated to the use of plain teeth, which may be made to look wonderfully more life-like than the commonly used and undesirable block teeth. Of course, if the base plate is to be of either red or black rubber, there must be a gum either of celluloid or pink rubber. The last, if properly constructed and bleached in alcohol in the sun for two or three hours, is quite satisfactory. The teeth must, however, be so arranged that but little if any more than the *margins* of the gum be shown. To produce the above style of plate, two vulcanizings are usually employed, and my object in writing this article is to tell how it may be done with one.

In waxing up the case, secure precisely the contour desired when done, so that no great amount of scraping will be required. The case is then placed in the flask in the usual way. When open, and previous to packing the rubber, cut waste-gates on the *palatal portion only* (*absolutely no other*). In packing, first place a narrow strip of rubber well down below the pins all the way around, then cut a strip of the pink rubber for the gum of a width sufficient to reach from the pins to the height desired for the gum. (If the wax was very thick, two thicknesses may be used.) Next cut a strip of the common

rubber wide enough to cover the pink (if necessary it may be stretched while warm, so as to be quite thin), and lay smoothly over the same, and finish the packing in the usual way.

In bringing the sections together be sure that the anterior portion closes first, or failure will result from the pink rubber being forced out and the other coming through to the surface.

In swaging gold and silver plates, there is many times a film from the dies left on the surface. If the plate be annealed without its removal, it is burned into the plate, causing roughness and brittleness. The plate should be smeared with oil previous to placing in the dies, and each time before annealing, wiped, and then placed in a dish of muriatic acid for a minute or two, which will entirely remove the film. After the annealing, it may also be placed for a moment in the same acid, which will remove all discoloration and beautifully bring out its true color.

SOCIETIES.

CONNECTICUT VALLEY DENTAL CLUB MEETING, APRIL 8, 1882.*

Subject for Discussion—CARIES.

PROF. CHAS. MAYR: "Are we able to distinguish exactly several kinds of caries, or is there but one kind? This question is of very great importance. Is there a physiological caries? I do not use the word "pathological" at all, because physiological covers it completely, and the distinction between physiological and pathological is only one of that great number of vague anthropocentric words. Or is there none but a septic caries? By physiological caries I mean this: Caries solely due to chemical changes of the protoplasm and connective tissue of the tooth, and not due to the presence of certain lower organisms; not due to the presence of certain simple chemical acids, like nitric, hydrochloric or sulphuric acid. Perhaps it will be good to define this kind of caries better still. The existence of a tooth is the resultant between the outer forces working to destroy it, and the inner forces, active in its preservation. The tooth will be destroyed if either

*These Club-meetings were held almost every week during two years, and were of a high scientific interest, though the number of participants was relatively small.

the outer forces become too strong relatively to the inner forces, or if the inner forces become too weak. The first would be the case, if persons living in chemical factories inhaled acid vapors, etc., which dissolve the tooth; but in this case, as the destruction of the tooth is due to simpler forces than in the case of destruction from within, we have no caries; hence, we may establish it a fact that simple chemical outer forces, even if abnormally strong, will not produce caries; the tooth will simply wear away, but the bioplasson of the remaining tooth will be just as strong, and remain as healthy as it was before the destruction of a part of the tooth, only its forces of supplying material could not keep up with the greater supply of destructive agents from without. I, therefore, consider impossible any decay produced by simple outer forces of acids and alkalis, and consider decay always associated with a weakening of the inner, resisting forces. The question coming up this evening is now this: Do there exist two kinds of such decay—the one due to nothing but a 'dying' of the bioplasson-fibrils in certain portions of the teeth, this dying being produced by imperfect nutrition from within; the remaining tooth substance, that is, the lime-salts, filled with unnourished connective tissue and dead bioplasson-fibrils would then undergo the process of slow disintegration from without by air, water, etc., without the presence of lower organisms or the organisms only coming into it as an addition:—or does there exist no such kind of decay without lower organisms from the start? Dentists distinguish a white, soft decay, and a common, black and putrid decay. Is the latter the one produced by the lower organisms, and the other one produced by physiological actions, or is this distinction merely accidental, the one being younger and in a mouth with less impurities, the other being old white decay? Or is it possible that first the one kind, say physiological decay, may exist, and afterwards in the spot organisms, bacteria and termones may settle as in a favorable place? About the second kind of decay, the septic, there can be no longer any doubt, with our present knowledge, that it is the most common, and that in every old decay, at least, the chief faction maintaining and extending the decay is contributed by lower organisms. The question is quite important, and not being familiar enough with many cases, I think that practitioners present might give their opinion as to the facts in this question."

Dr. F. Searle: "Is there not always a small crevice or spot where food collects and cannot be removed, and where fermentation starts the decay and dissolves the lime-salts?"

Prof. Mayr: "If this were the case, we never would see decay started on surfaces which are always kept clear from accumulations of food, like the labial surfaces of incisors and cuspids, but decay starts there in the middle of the surface, while points between the teeth remain free from it. I myself know a case of a gentleman who kept his teeth most scrupulously clean, was under the constant care of a dentist and, during the space of less than four weeks, at least a dozen small cavities had developed—not between the teeth, but mostly on the labial surfaces of his incisors, and on the crowns of his molars. They were very small, white spots at first, but extending considerably in all directions. In this case the food-theory will not be adequate to account for the most unequal distribution of the cavities almost in direct opposition to the food-theory. I do not doubt that the food-theory accounts for most of the common decay between the teeth, at least as one of the factors, but it is inadequate to account for such cases which probably occur with every practitioner. That is precisely the point I wish to come to; if there is such a kind of decay, a dying from within, rather than a being killed from without."

Dr. Ross: "I have met with such cases and accept this view, that there are two kinds of decay. I have found that the most carefully prepared fresh litmus paper was not reacted upon by application to the carious surface of teeth."

Dr. Searle: "I think we err in taking litmus in testing. If an acid does the mischief, it is in the recesses of the cavities; that is, I may take some vinegar or sour wine, the food becomes saturated with the excess of acid, it is lodged between the teeth and there starts the mischief."

Dr. Stockwell: "It is in decalcified tissue that you work when you test with litmus, until you come to the border line of diseased and healthy tissue."

Dr. Searle: "You never can get the litmus within the softened dentine."

Dr. Stockwell: "Where diseased tissue meets the healthy, you would not get an acid."

Dr. Searle: "Certainly, it is the decalcified tissue which contains all the agent that does the destruction. There is lime in a healthy tooth; there is acid in the decalcified tissue; the two combine at the surface of the healthy dentine, and there being an excess of acid, it takes away more and more, and thus works by degrees. It certainly is brought in from without."

DR. ROSS: "Outside the mass is neutral, against the healthy tissue—an excess of carbonic acid or neutral. All the acid would be between two neutral layers. The decomposition and formation of acids do not play a great part in the decay of teeth."

DR. STOCKWELL: "That is the germ theory."

DR. SEARLE: "I have heard the opinion that the product of decalcification furnishes the material for new decalcification."

PROF. MAYR: "That may be by furnishing bacteria."

DR. MORGAN: "About decay, I believe everything is a cause. I believe all the theories from the beginning to the end, and I believe that teeth decay like mischief, but I fully believe that the very same influences that act in the system outside, act in the tooth. At the same time when you get an abnormal condition of the nerve fibrils in the tooth, the whole system is in a condition to promote outside morbid influences on teeth, saliva and mucus of the mouth; and I think that the whole system is deranged, so that you do not only get a weakened tooth itself, but you get an increase of external unfavorable conditions. There are a great many cases in which I cannot explain decay otherwise than by the chemical theory, although I have seen a great many mouths where there are all the external causes for decay, where the teeth are not cared for at all; it would seem that all the favorable conditions for simple chemical influences are present in these mouths, but they are apparently unable to overcome the forces within."

DR. FONES (Bridgeport, Ct.): "If the chemical theory was true, I should think that persons in acid works would suffer most from decay. Such patients often come in my office; my assistant and I have examined their teeth very closely; they are dissolved where the breath would strike them, but they show no decay."

DR. SEARLE: "I would ask why dentine should not resist chemical action better than enamel, being better supplied with nerve force?"

DR. MORGAN: "First, chemical action commences, and septic action then comes in to finish the work."

PROF. MAYR: "About the septical theory and its principles there is no longer ignorance among us. We all may consider the facts as settled. But why does not healthy tissue become attacked like diseased tissue? To explain the fact, we have again to go back to the simpler forms of bioplasson, to amœbæ. Amœbæ may live in water containing bacteria; but why? Simply because they eat them up; or, to express it more scientifically, the bioplasson of the

bacterium becomes a part of the bioplasson of the amœba—the latter being in excess and a more stable compound. The same will happen with a tooth; bacteria may enter healthy enamel; their number, from the great density and the closeness of the network of the enamel, is only small at one time, and the fibrils within, being on guard, so to say, do nothing more or less than dispose of the entering bacteria by way of assimilation. Thus, as long time as the fibrils prove stronger, the bacteria will not gain entrance; but let the fibrils become weakened and they will crowd in. The danger of a part of the enamel being taken away lies in the fact that the dentine, being provided with much wider canals, the bacteria may enter in much larger number and thus overpower the fibrils of the dentine. The fight is long and slow, but the dental fibrils never will be able to recapture lost positions. To speak figuratively: The whole "life" of the tooth, after it is once formed, is not one of active growth but one of conservation; its bioplasson may, therefore, well defend the parts of the fortress not yet taken, but it will never advance, or only in very rare cases. The supply of bacteria is very great; after every meal we harbor a certain number. They are everywhere, and the weak spot will surely find its attacking bacteria, which have the other dangerous quality, very different from human soldiers, to grow more numerous by themselves; thousands are slain every day, but let them get in a favorable spot and thousands rise up in shortest time. The bacteria try to intrude into the healthy membranes of the mouth just as much as in teeth, but there the chances are very small and only in diseases they enter; we see diphtheritic membranes swarm with them and their offspring; the struggle for life in teeth is not less violent than it is in outer life."

Dr. Ross: "If the septic theory of decay is true it must be that the living matter, the fibrillæ are unequally nourished, weak and atrophied, in portions of the tooth structure, particularly beneath proximating surfaces; just where we would naturally look for greater resisting force to attacks from without. Sections of children's carious, deciduous teeth show filaments of fungi in and bordering the cavity. Have examined the soft, light-colored deposits close to the gum border upon the teeth of a man who never brushed his teeth, in which vibriones could be distinctly seen, and yet there was no decay."

The National Dental Association of the United States of America meets August 3, 1882, in Washington, D. C.

The American Dental Association meets in Cincinnati, Ohio, the first Tuesday in August—5th—1882.

Maine Dental Society.—The Maine Dental Society will hold its seventeenth annual session at Dexter, Tuesday and Wednesday, July 18 and 19, 1882, commencing Tuesday evening. A general invitation is extended to dentists and others interested to attend the meetings.

D. W. FELLOWS, *Secretary*,
Portland, Me.

New York State Dental Society.—The fourteenth annual meeting of this society was held at Albany, N. Y., May 10 and 11, 1882. The following officers were elected for the ensuing year: L. S. Straw, Newberg, President; Frank French, Rochester, Vice-President; J. Edw. Line, Rochester, Secretary; A. H. Brockway, Brooklyn, Treasurer; W. H. Atkinson, New York, Correspondent.

J. EDWARD LINE, *Secretary*.

Odontological Society of Western Pennsylvania.—The meeting of the above society, held in Washington, Pa., during the week from June 14–17, was very interesting. The following officers were elected: President, Dr. J. P. Thompson, of Johnstown, Pa.; Vice-President, Dr. W. E. Van Orsdel, of New Wilmington, Pa.; Secretary, Dr. H. DePuy, of Pittsburg, Pa.; Treasurer, Dr. L. DePuy, of Pittsburgh.

Board of Censors—Drs. H. W. Arthur, J. G. Templeton and Gale French.

Delegates to the State Association at Williamsport, Pa., July 25, 1882—Drs. G. G. Crow, D. P. Stewart, Gale French, M. B. Lowry and J. E. Libby.

Delegates to the American Dental Association at Cincinnati, August 1, 1882—Drs. H. W. Arthur, Gale French and C. King.

Drs. J. G. Templeton and H. DePuy, appointed to enquire into dental hygiene in our hospitals, reformatory and charitable institutions, made a report, showing thorough investigation of the subject. From their report, a worse condition, from a dental standpoint, would be hard to imagine.

The meeting closed with the retiring president's address. Adjourned to meet in Johnstown, Pa., the second Tuesday of September, 1882.

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ORIGINAL COMMUNICATIONS.

"CREED OF THE NEW DEPARTURE," AND SUMMATION OF PRINCIPLES RELATING TO FILLING TEETH.

BY MARSHALL H. WEBB.

The "creed of the New Departure" was first made known by Dr. Flagg, at the meeting of the New York Odontological Society, November 20, 1877. "The time-honored and ordinarily 'accepted creed' of dentistry" was then given, also, which, if not prepared for the occasion—if not "time-honored"—had evidently been modified by the one who framed and announced the "creed of the New Departure."

Some parts of the "accepted creed" are not acceptable to first-class operators, even though the creed may, as a whole, be "ordinarily accepted" or approved by the majority of practitioners.

The following ten articles are given as a summation of some of the principles which ought to guide all practitioners in the filling of the teeth, and the practice of the finest operators indicates that they are guided by such principles.

That the reader may compare the "creed of the New Departure"

with the principles by which fine and first-class operators are guided, each article of this creed will here be given with that part of the summary of principles which corresponds in number with it. Each operator who may be in doubt about the methods presented can thus more fully decide, or be enabled now to determine which constitutes *the better practice.*

ARTICLE I. *New Departure.*—" In proportion as teeth need saving, gold is the *worst* material to use."

ARTICLE I.—*The Better Practice.*—Gold, *properly used*, is the *best* known material for the permanent preservation of the teeth.

ARTICLE II. *New Departure.*—" Neither 'contouring filling' nor 'separating teeth' has much to do with the arrest of decay."

ARTICLE II. *The Better Practice.*—With restoration of contour so complete as to keep the margins of enamel free from contact with the tooth adjoining, extension of decay is prevented.

ARTICLE III. *New Departure.*—" Failure in operations is mainly due to incompatibility of filling material with tooth bone."

ARTICLE III. *The Better Practice.*—" Failure in operations is mainly due" to the gold not being closely packed against the dentine and enamel at every part, so that fluids enter at such part and further decay takes place—the failure of a filling, therefore, is " mainly due " to the *incompatibility* of the operator with his work.

ARTICLE IV. *New Departure.*—" A tooth that can be so treated as to be satisfactorily filled with anything, is worth filling."

ARTICLE IV. *The Better Practice.*—A cavity that can be " satisfactorily filled with anything, is worth filling " *with gold*—the contour of any tooth can be restored with gold if the operator has the ability to properly apply the rubber dam and perform the operation.

ARTICLE V. *New Departure.*—" Skillful and scrupulous dentists fill with tin covered with gold, *thereby* preventing decay, and pulpitis, and *thereby saving the tooth.*"*

ARTICLE V. *The Better Practice.*—Skillful operators first see that parts are in normal condition, and then so perform operations with gold as to prevent further decay, or they fill with oxychloride of zinc and cover it with gold to avoid shock from changes of temperature.

ARTICLE VI. *New Departure.*—" A filling may be the *best* that is known for the tooth, *and yet leak badly.*"

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*If " gold is the *worst* material to use," (Art I., "*New Departure*"), why do " Skillful and scrupulous dentists" even as much as *cover* tin *with gold*, . . " *thereby saving the tooth* " (Art. V., " *New Departure*")?—M. H. W.

ARTICLE VI. *The Better Practice.*—A filling *material* "may be the *best* that is known for the tooth, *and yet leak badly*," because of "defective manipulation," but to save the tooth that best material, gold, must be so inserted as to prevent leakage.

ARTICLE VII. *New Departure.*—"Gutta-percha, *properly used*, is the *most permanent* filling material we possess."

ARTICLE VII. *The Better Practice.*—"Gutta-percha, *properly used*," is a *good* filling material, but it serves a temporary purpose only, excepting where it is free from the friction of mastication, from the use of brush and powder, and from floss-silk, when it may prevent decay for several years.

ARTICLE VIII. *New Departure.*—"A *poor* gutta-percha filling, *in its proper place*, is better than a *good* gold one."

ARTICLE VIII. *The Better Practice.*—"A *good* gutta-percha filling, *in its proper place*, is better than a *poor* gold one," and better than any other material inserted in a careless and imperfect manner.

ARTICLE IX. *New Departure.*—"Amalgam, *per se*, is an *excellent* filling material."

ARTICLE IX. *The Better Practice.*—The *excellence* of "amalgam, *per se*," consists only in enabling an operator to fill a cavity with it, when he might otherwise resort to extraction. [Amalgam shrinks and fluids penetrate between it and enamel, which becomes fractured little by little; oxidation takes place, and, whilst slightly retarding decay, the oxide discolors tissue, especially the dentine in the teeth of young persons, and the filling presents an unsightly appearance.]

ARTICLE X. *New Departure.*—"The use of 'plastic' filling materials tends to lower that Dentistry which has for its standard of excellence 'ability to make gold fillings,' but very much extends the sphere of usefulness of that Dentistry which has for its standard of excellence '*ability to save teeth.*'"

ARTICLE X. *The Better Practice.*—"The use of 'plastic' filling materials" does not tend to the exercise of that care, and to the development of that skill, which is necessary for the successful practice of "that Dentistry which has for its standard of excellence 'ability to make' *good* 'gold fillings,'" and an operator with such ability cannot only so perform operations with gold as "*to save teeth*," but he can insert any other material more perfectly than any one who has not the "ability to make gold fillings."

In connection with these articles it may be best to state that, in cases where calcification is imperfect and solution of the lime-salts of

the teeth takes place rapidly, it is well to keep cavities filled with gutta-percha or oxychloride of zinc until there is more complete deposition of lime-salts in the basis-substance of the enamel and dentine. If a permanent operation is to be performed with gold before perfect calcification takes place, it is absolutely necessary to free the edges of enamel and to keep the margins from contact by full and complete restoration of the contour of missing tissue.

Various methods have been devised or adopted for the purpose of lessening the time necessary to insert fillings, and to make them simple, easy and cheap, by the use of amalgam or other plastic materials, but, in addition to the excellent judgment and ability required, sufficient time must be taken and the use of gold is necessary for the performance of really fine, beautiful and permanent operations.

In literature, sculpture, painting and music, and in operations such as dentists ought to perform, it is not the aim of a Dryden, a Michael Angelo, a Raphael, a Beethoven, or a Varney, to write, carve, paint, bring forth in " concord of sweet sounds," or to produce in gold, that which requires but little time and skill, and is simply cheap, and unartistic, but perfect and beautiful.

EUCALYPTOL AND GUTTA-PERCHA IN ROOT CANALS.

BY GEO. L. PARMELE, M. D., D. M. D.

In the New England Journal of Dentistry for April, of this year, I made slight mention of eucalyptus in the treatment of devitalized pulps, and of its use in combination with gutta-percha for filling pulp canals. In the May number of the same journal, I was requested by D. D. S. to give more in detail my method of preparing and using eucalyptus and gutta-percha ; also if, in my opinion, cotton moistened in eucalyptus would not serve equally well for the same purpose ; and, furthermore, if I had ever used the remedy in cases of abscess. Now, in order to " kill two birds with one stone," it is my purpose in a very few words to answer D. D. S., and at the same time fulfill my promise to write a paper for your society.

Before proceeding to consider the practical application of the remedy in question, it is well, perhaps, to offer a few remarks concerinng the remedy itself.

In the order *myrtaceæ*, we find a genus of trees mostly indigenous to Australia and the Indian Archipelago, known as eucalyptus, containing one hundred recognized species, among which mention may

be made of Eucalyptus resinifera, E. mannifera, E. dumosa and E. globulus.

E. resinifera or brown gum-tree of New Holland, and some other specimens, yield a concrete juice known as Botany Bay Kino.

E. mannifera, growing in New South Wales, yields a sacharine substance which, from its resemblance to manna, is so called.

The same product is obtained from E. dumosa, which is a native of New Holland.

It is, however, from the leaves of the eucalyptus globulus, or blue gum tree of Australia, that we derive the product now under consideration. It is a tree of large size and of rapid growth ; the wood, being hard, is largely employed in ship building. The trees of this species are of the largest in the world, and have attained a height of 375 feet.

The leaves from which the medicinal properties are obtained are leathery in texture, and studded with glands, which exude a fragrant, volatile oil. The leaves of young trees are large, sessile and of a dull green, covered with fine white powder, easily rubbed off. Those of the older trees are ensiform, measuring from six to twelve inches in length.

The trees have lately been planted along the line of the Central Pacific railway, in California, for the purpose of lessening the liability to droughts. They grow as well in a damp as in a dry and exposed soil, and bear cold very well, having resisted a temperature of 21° F. The Detroit Lancet says that Dr. D. J. Snyder, of Scio, Ohio, will furnish seeds of the eucalyptus globulus, with directions to plant, to any medical gentleman who desires to attempt the effort to raise them. He is sure, that if the plants are kept for the first winter in a hot-house, they will gain strength sufficient to enable them to endure the following winters.

These trees are said to have the property of rendering damp, marshy districts free from miasma, and many millions of them have been planted in Algeria, France, Italy, Cyprus, and other countries.

This property is ascribed to the drainage effected by their roots, rather than to any antiseptic exhalations from their leaves. The leaves have long been used in Australia, with great success, in fevers.

The preparations in use of eucalyptus are *tinctura eucalypti*, *extractum eucalypti*, and *eucalyptol*, which latter is the essential oil of the leaves, and the physiological actions of eucalyptus are due to this oil. It has a warm, aromatic taste, and increases the flow of the

saliva. Among the diseases in which it is said to be used with benefit are pulmonary gangrene, hay fever, palpitations frequent in women about the change in life, hysteria, etc. But the most important use (internally) is in treatment of catarrhal affections of the mucous membranes; especially catarrh of the bladder.

As an antiseptic of high order in the treatment of foul ulcers, abscesses and sloughing wounds, the superiority of eucalyptol has already been proven both in this country and in Europe. It is a much more powerful antiseptic than carbolic acid; its effects more permanent; it has no irritating or caustic action, and thus possesses all the advantages of an antiseptic, with none of its unfavorable properties.

While a few object to its taste, I find that nearly all find its taste far less objectionable than carbolic acid. Mr. David Hepburn, in a paper entitled "Chronic Suppuration Connected with the Teeth," read before the Odontological Society of Great Britain, gives great praise to eucalyptol for its marvelous power as an antiseptic agent. In a case of abscess, where there had been an incessant discharge of putrid pus in large quantities, he found that eucalyptus rendered everything pure as nothing else could do, and whenever its use was discontinued there was a return of the discharge. Dr. Rollins, of Boston, suggests its use in a mouth wash, as follows:

℞. Sodæ boratis, 15 grams;
Olei eucalypti, 2 grams;
Magnesiæ carbonatis, 4 grams;
Aquæ, 1000 grams.
M.

A. S. Underwood, M. R. C. S., L. D. S., England, in the Monthly Review of Dental Surgery (London), recommends it very highly in treatment of dead roots, and abscesses about the mouth, using it alone or in combination with iodoform. I have used iodoform with it, but thinking I succeed as well with eucalyptus alone, and as the smell of iodoform is so disagreeable and sickening, I have abandoned this combination. For the benefit, however, of those who desire to try it, I give the following formula, taken from the Louisville Medical News, which it claims will effectually mask the odor of iodoform:

℞. Iodoform, ʒss;
Oil lavender, gtt x;
Alcohol, flʒii;
Glycerine, flʒvi.
M.

I have used eucalyptus now for two years, and the results obtained in the treatment of dead pulps, alveolar abscesses, and diseased antra, warrant me in highly recommending it to my brother practitioners. I use an extract of the leaves prepared by Sander and Son, Sandhurst, Australia, they being, I think, the sole and exclusive manufacturers. It should not be confounded with *ol euc. c. ligno* (wood oil). It can be had of reliable druggists in any large city.

It is my custom, after a pulp has been *thoroughly* devitalized, to carefully adjust the rubber dam and so prepare the crown that free and as direct access as possible be obtained to the pulp cavity and canals; then, by means of the usual nerve instruments, I carefully enlarge the canals and remove all that is possible of the devitalized pulp. Having accomplished this, I repeatedly wash out the canals with alcohol carried up by means of cotton on fine broaches, and pumped up also. Then, by means of fine needles of bibulous paper and the hot-air syringe, I thoroughly dry the cavity and canals. My next step is to force eucalyptus up in the same manner as the alcohol. If there has been no periodontitis, I at once proceed to introduce gutta-percha into the roots. This I accomplish by warming small bits of gutta-percha and, with the aid of a spatula, rolling them on a porcelain slab until they are reduced to fine wires, pointed at one end. These gutta-percha wires I dip, while warm, in eucalyptus, and immediately insert them into the canals, forcing them up to place with fine, smooth broaches. It will be found that enough gutta-percha will be dissolved to form a paste-like mass, which will be forced up into the minutest parts of the canal. This part of the operation should be gently performed, so as to avoid forcing beyond the apex. In cases where there has been previous trouble, I pack the roots with cotton and eucalyptus, and insert a trial filling, for a few days, of gutta-percha. After packing the canals, I generally dry out, and fill the remainder of the cavity with oxyphosphate cement until such time as I am prepared to insert the permanent filling in the crown. Always, after finishing the root fillings, I paint gums with iodine. It was formerly my custom to cleanse the roots slowly, at different sittings, but I think I have been more successful since I adopted the immediate and thorough method. My records show that in the past two years I have developed no after-inflammation, which was not easily arrested. Where constitutional treatment is required to arrest periodontitis, I obtain the best results from aconite and belladonna.

In reply to D. D. S's second question, I will simply say that I con-

sider the *permanent* filling of root canals with cotton, and any medical preparation, a pernicious custom, although I have seen cases where it has been successfully accomplished for years. In the treatment of abscesses, I generally use eucalyptus in the same manner as carbolic acid, or any other antiseptic. I find that a very convenient way to dilate the fistulous opening of an abscess is by using suitable sizes of violin strings, dipped into eucalyptus, and immediately introduced into the fistula as far as possible, cutting off even with the opening of the fistula. The next day it will be found swollen, and the fistula dilated. If necessary, a larger size can then be introduced until the desired dilation is accomplished. Small medicated bougies introduced into these fistulous openings are often a convenient method of medication.

The preceding paper was presented to, and read before, the Massachusetts Dental Society, at its seventeenth semi-annual meeting, Boston, June 8 and 9, 1882.

SOCIETIES.

CONNECTICUT VALLEY DENTAL SOCIETY.

The semi-annual meeting for 1882 was held at Amherst, Mass., June 29 and 30.

The morning session—first day—opened at 11.30 o'clock, President C. Fones, of Bridgeport, Conn., in the chair.

The secretary's report of the annual meeting for 1881 was read and accepted.

Under Miscellaneous Business, the following was adopted relative to section reports :

Resolved, That the reports of the various Section Committees be received in their respective order, with the exception of Section 1, which shall be the regular order for the evening session, and that the full report of each section be heard previous to discussion of said reports.

Resolved, That the presentation and discussion of reports be limited to two hours each.

Resolved, That the time of meeting of sessions be as follows : Afternoon session to commence at 2 o'clock ; close at 6 o'clock. Evening session commence at 7.30 ; close at 10. Morning session, second day, commence at 10 ; close at 1 P. M.

Dr. Stockwell, who offered these resolutions, that were adopted,

also suggested to the assembly that the convention be in readiness on Friday, at 8.30 A. M., to proceed in a body from the hotel to the various college buildings, devote one hour to the inspection of museum, various cabinets and art gallery—the convention to be met there by carriages, at 9.30, furnished by courtesy of Dr. Vincent, and enjoy a half-hour's ride, returning to the hotel in season for the opening of the morning session.

Voted, That the secretary be empowered to issue delegate certificates to members to the American Dental Association meeting, at Cincinnati, August 1, 1882.

Voted, That the regular order be suspended till the afternoon session, for the benefit of those not yet arrived, and take up for discussion "Incidents of Office Practice."

DR. VINCENT: To start the wheel, I would like to ask if any gentleman present, in extracting a temporary tooth, has pulled out the germ of a permanent tooth?

DR. MORGAN: I sometimes pull out more than I can answer for. I cannot always tell precisely what I do pull out.

DR. STEBBINS: I would ask if Dr. Vincent could explain and give an account of the little girl that was once brought to me with a swollen face. I think the left inferior second temporary molar tooth was giving the trouble. The physician wanted the tooth extracted. The tooth was extracted and the germ of the bicuspid was in the abscess sac. I would like to find out more about it.

DR. VINCENT: It is a long story. The parents had spent several hundred dollars in doctoring at Springfield when I saw the case. When I first saw the child, I found that the left inferior central incisor was taken out, but there was still a discharge from the face. The child still had good looks, and I suspected necrosis of the under jaw, but had no idea what the trouble would be. The child came to me over two hundred times. I cut away from the condyle to the mesial line nearly the whole of the bone, trying to leave a little. I think I destroyed every germ of the permanent teeth. The child, as far as my part is concerned, is well to-day; she has three sores on the hand, arm and foot. This little girl bothered me terribly. I put setons in the jaw, but kept away from the inferior dental nerve. If you think best, I will bring her to-morrow. She had anchylosis of the joint where she had a former necrosis. I had to be very careful not to break the remnant of the jaw.

DR. STOCKWELL moved that other gentlemen present, but not members of the society, be entitled to the floor. (Voted.)

Dr. W. H. Atkinson (New York) : This case is representative of cases typical in clinics and hospitals, and the question as to the cause, etc., depends on our knowledge of the history and the origin of the child, and on the doctrine about the origin of scrofula. In some colleges they say that there is no scrofula that did not originate primarily from syphilitic poison. This is too occult a subject to enter into in an off-hand speech. To be competent to say anything in this line, we have to spend a lifetime in such investigations. The question which was first suggested, as to taking out the germ of the permanent tooth with the temporary tooth, is of great importance to every dentist, and every dentist who understands the history of a tooth can determine whether it is safe to extract a temporary molar or not, which alone can involve the germ of the permanent tooth between its roots. The roots of the temporary molar are large and flattened, embracing the territory of the coming bicuspid. There is another question suggested : if the tooth would not have been removed by normal absorption, and if it was not extracted too soon. To decide this depends, of course, on the age of the child.

Dr. Vincent : It is immaterial whether the child was ten or two years old. If necrosis of the jaw was there I would not hesitate to pull out a tooth. It was pulled out because of inflammation from the outside. I could have done it with my fingers.

Dr. Atkinson : That is correct. At the age of five years, the bicuspid has five and one-half years to grow before it is erupted. There is no general rule as to the period when an organ or tissue becomes mature ; we have to speak generally and in possibilities. At that time the calcidulous cyst, in which the germ is forming, was not yet formed. As to the propriety of taking teeth from a necrosed jaw, without the sequestrum, is too large a field, and involves a knowledge of which only a little has been revealed. The old idea that a sequestrum should be formed before an attempt of removing is made, will be found to have overloaded the literature, and it has been my own misfortune to have controverted the method of early operations in treating necrosis. The territory of the necrosis has a point at which it starts. If a nerve or tract of vessels is deprived of supply, a derangement will be set up by the disturbance of the nutrition, and one must be well posted in physiology to determine whether it is pathological or not. The question of inflammation comes up here, which is difficult to determine. The first step from the normal is the arrest of nutrition, and obstruction of the nutrient current which is concerned

with the local embryonal corpuscles. The obstruction may result in retrograde metamorphosis of the parts by returning to the embryonal condition, by which the tissue may be reformed, or, if we suppose it to break down, there is a point where it is legitimate to call it inflammation; there are four steps in inflammation to render it pathological. If we understand a burning as a chemical change of the elements which constitute a substance, we have to distinguish two kinds; one is where you get ashes, the other is slow combustion, where you get hydrogen removed and carbon left. Now the charcoal left in making charcoal is similar to the charred remains in the necrosis.

Dr. Vincent: With that inflammation the tooth was so involved that there could not be a particle of bone left.

Dr. Atkinson: The bone is dissolved by retrograde metamorphosis; the lime-salts of the bones are dissolved, the bone is melted. It is no longer bone, but the elements are there; they are not reckoned chemically as bones; they would be bones if the territory was so that all the soft tissues were destroyed and the bone left. It would look like the original bone, but within the territory of the bone corpuscles, protoplasmic bodies would be found. That is one of the differences between Dr. Farrar and myself, why he was so offended. At a recent meeting, forty pieces of the thigh bones of the ox, that had been used at the kitchen, were here produced as specimens of necrosis. I could talk a month on that. Some parts of the bone are always carried away without spiculæ.

Dr. Vincent: As in the arm before anchylosis?

Dr. Atkinson: I doubt about anchylosis. What is anchylosis? Anchylosis means immobility of the joint. There are two kinds: one that is permanent, consisting in the solid union of the structures. But we have another kind—one in two hundred patients has the first kind, and all the rest the second kind—when it is only muscular paralysis which prevents motion.

Dr. Vincent: May not both be combined?

Dr. Atkinson: Yes, they are sometimes, and I want to impress you that books never tell you all the differences. They tell typical cases, but practically the cases look often very different. This case might have been well taken care of, if it had not been in the hands of incompetent persons who did not relieve the local mischief when first appearing.

Dr. Searle: May I ask where?

Dr. Vincent: In the jaw.

Dr. Searle: Is there pretty good evidence that there was local disturbance?

Dr. Atkinson: I presume you do not take this into consideration, and there are few who do: there is no local inflammation that does not depend on constitutional disturbances.

Dr. Vincent: The blood of that young girl is of a peculiar kind.

Dr. Atkinson: The finest blood is in the interior of the nervous system.

Dr. Searle: If I understand right, you implied that the physician ought to have treated the case locally to have cured the whole child?

Dr. Atkinson: Certainly.

Dr. Searle: How can you cure a constitutional disease by removing spiculæ?

Dr. Vincent: It is such a simple matter that any dentist in the room ought to have been capable of treating the case locally, as Dr. Atkinson says, but neglect by men who held high diplomas brought about the grave result.

Dr. Searle: I am not satisfied yet. Was the necrosis of the jaw the consequence of the systemic septic taint, or was the necrosis the cause of the whole systemic derangement?

Dr. Atkinson: Necrosis is always systemic. We know nothing of the causes. The pabulum of the entire body was deteriorated; but it is reported that it started in the jaw. It is just as with a boil; you do not wait until it opens itself; we open as soon as we find out that it is going to result in necrosis of tissue.

Dr. Searle: That is far from the point that I meant. I did not say necrosis, because it cannot yet have been necrosis. It is the first step that I meant before necrosis has set in. Please tell what course the physician should have taken?

Dr. Atkinson: When they found a local inflammation they should have cut down.

Dr. Vincent: Do you use setons? If any better or different way of draining the child's slough was known, I would like to know the method.

Dr. Atkinson: What you had to do was to take away what you could. Pus swallowed in the stomach never starts pyæmia. This only originates where vessels resorbe it and carry it into the system without its going through the stomach. Pus is a fine digestible food. What is pus? Nothing but dead blood corpuscles; and, do you not forget it, it is worth millions to the sick. When you talk about pus,

you generally speak of pus and ichor mixed together. Pus never stinks; it is as bland and sweet as an angel's breath. They have mistaken the idea of what gives the deterioration. It is the sulphuretted hydrogen and the ammonia, that result of retrograde metamorphosis, which produce the dreadful odor. We have smelt the breath of people dying from tuberculosis, and say that it is the pus which stinks; but it is the broken down tissue. That is where the pathologists are all afloat, and they should be put into chowder-mills to grind out the truth, so that we understand it like mathematics, and might be master healers in place of mere assumptionists of truth.

Dr. Vincent: SH_2 is one of the worst-smelling substances. Where I got it most offensively was from a darkey. He had a discharge where he wore his belt around his waist. The physicians and doctors were probing in all directions, and could not find the cause. I suggested that they look in the mouth. The next day I met the doctor on the walk, and he says: "Why would you look in that mouth —probably because you are a dentist." In the afternoon, the fellow came into my office, and I pulled out a tooth with the finger, and that was what caused the trouble. If they had continued as they did, I do not know where the case would have gone. He had been doctored for a long time, and had got pretty low. Through the folds of the muscles the pus had found its way down to the belt. The man recovered rapidly.

Dr. Atkinson: That corroberates what I said. The moment you remove the source of the mischief nature takes care of the result. I remember a case where the pus from a lumber vertebra discharged at the little toe. In such diseases you cut away till the burr comes into perfectly healthy tissue. I should prefer to cut away the tissue so as to get a decent form.

Dr. Vincent: I would like to say that I never cut at the outside as long as it can be done on the inside, if it is possible to do it without having any scar left.

Dr. Atkinson: That is a good criticism, because I myself never cut on the outside as long as possible. It is a mistake that a cut will leave any but first-rate scar-tissue, but you get third-rate tissue from inflammatory action alone.

Dr. Morgan: I would like to ask Dr. Atkinson how to detect if in a given case an inflammation is going to be severe enough to cause necrosis, and what the rule is for an operation.

Dr. Atkinson: There is no rule that I can give, no rule that any-

body can give—no more than you can give a man who is not an expert violinist a violin, and expect good music. I do not know how I come to diagnose myself, unless it is by a revelation to my consciousness. The chief thing is the dactylus eruditus, and that is the point. It requires fine, sensitive fingers to find out by touch the exact degree of hardness at the point of inflammation, when it is time to cut and where.

Dr. Searle: I think it is the most disagreeable thing in the world that we should pursue an expectant course. I would not deny that Dr. Atkinson has the illumination to foresee the result, but I think the majority of intellects would not be thus endowed, and the only proper rule to be established is the expectant rule. It is very seldom that these cases prove to be so serious in their results.

Adjourned till 2 o'clock P. M.

PROCEEDINGS OF THE CENTRAL DENTAL ASSOCIATION OF NEW JERSEY, MAY 25, 1882.

A regular meeting of the Central Dental Association of New Jersey (incorporated), was held at the office of Dr. S. C. G. Watkins, Montclair, N. J., May 25, at 8 P. M., some forty members and visitors present, including several from New York city, Philadelphia and Brooklyn. Programme: Essay, by Dr. W. G. A. Bonwill, D. D. S., of Philadelphia—subject, Bonwill Crowns. Essay, by C. A. Marvin, D. D. S., of Brooklyn—subject, Artistic Talent necessary to Eminence in Mechanical Dentistry. Essay, by Dr. G. A. Mills, of Brooklyn—subject, Pericementitis, its Manifestations in the Oral Cavity and its Serious Effects upon the General Health. (This paper was read by invitation before the Kings County Medical Society, Brooklyn, and Dr. Mills was invited to re-read it at this meeting).

Dr. Bonwill's paper was a revision of one published by him in the Cosmos, on the introduction of his new porcelain crown. He stated that he had found this course necessary because of radical improvements which he had made, both in the construction of the crown and the pin. He regretted that the introduction of the first samples of his design was so premature, but now he felt that there could be some assurance given for their real excellence; yet there had been a creditable interest in them shown by the profession, as the sales had amounted to some 35,000. The paper treated principally of improvements in the pin, made of a combination alloy, admitting of a more perfect incorporation with the metallic paste, or (as he termed it),

gold alloyed amalgam, containing some 27 per cent. of gold. Although it is more expensive, yet he thought the results justified the extra cost. The under-cuts made in the crown he felt would prove of great value. The details (in all their minuteness) of setting the crowns were dwelt upon with much precision, and he emphasized the necessity of care and nicety of manipulation in order to achieve the best results. He evinced much earnestness in his declaration of the belief that the profession would accord to him the praise of producing a valuable auxiliary to them, and a boon to the public. By diagrams on a blackboard, he illustrated the mechanical principle of his work, which showed a marked understanding of mechanics. He was listened to with more than ordinary interest—as all men are who are honestly in earnest; and as yet they are not thick enough to do much harm by any excess of enthusiasm. Dr. Osmun, the president, said he had set some three hundred and sixty of these crowns, and knew them to be valuable. He said that he found difficulty in getting molars that he could make in any large sense useful. They were not large enough in their diameter, and the bicuspids were not short enough. Dr. Bonwill said he was trying to remedy that defect, and felt that he would succeed in forcing the manufacturers up to the demands. He spoke of the difficulty attending the introduction of these crowns in overcoming obstacles that tended to delay the best attainments. He urged the careful watching of all the crowns as they were selected at the dental depots, and as they found defects to throw them back on the dealers, who would then find it to their interest to try and produce a more perfect article. Dr. Meeker spoke favorably of the crowns.

Dr. Marvin's paper being next on the programme, a note from him was read, stating his disappointment in not being able to be present with his paper on account of sickness, and that he would hold himself ready to read it at any future time.

Dr. Mills was then introduced. He stated that he would not offer an apology for re-reading the paper which he had read before another body; that at the time he was invited by the vice-president, Dr. Watkins, he was in some doubt as to what he would be able to do, as he had a paper in preparation, but it was suggested that he re-read the one announced in the programme. He felt that it was eminently a useful subject to them, and if they could imagine themselves for a while a medical society, the construction of some of the sentences would seem more appropriate.

Dr. Stockton, of Newark, spoke in commendation of Dr. Bonwill's efforts in providing so successfully an artificial crown. He looked upon it as a step decidedly in the advance, and he thought that this subject of Dr. Mills' paper gave hope that ultimately we would succeed in that which all should desire—securing the roots as well as the crowns; and when this disease was brought under a larger understanding, and we became able to cope with this cyclone of destruction as a profession, we would have taken a fruitful step. He believed that more teeth were being lost by this disease than by any other, and he was truly glad that Dr. Mills was manifesting so much interest in it by urging it upon the attention of the profession and the world of people who are the sufferers from it. He said there was no subject in our calling that he felt a more lively interest in than this; it was the great field of the future for us to cultivate a knowledge of. He did not claim to know anything about it, but would do all he could to encourage Dr. Mills in achieving practical results by putting patients into his hands. He said he had sent patients to him already, and had an arrangement now with him to come to his office to treat a case of special interest to him, which Dr. Mills says is amenable to treatment. He was thankful to the doctor for his paper.

Several questions were asked by different ones in regard to cases. Dr. Mills answered them by saying that there were so many circumstances attending the variety of cases that he could not intelligently diagnose them or give a reliable prognosis. Success was attainable in degree. All that we did in our practice was under limitations. The disease might recur after treatment, but it would then be only incipient. Patients must understand that it was a specific disease, and when it did recur in any degree it should have the attention that we require of all our practice in order that we may be able to attain the best results. He said he was more convinced than ever that it would be some time before there would be a large number engaged successfully in this work; it was a field that required special culture to be prepared for.

A vote of thanks was given to Drs. Bonwill and Mills for the interest they had contributed to the meeting. This meeting evidenced a decided improvement in the Jersey dentists; they show that they are heartily in earnest, and alive to all that is helpful in a professional sense.

Dr. Watkins, with whom the society met, shows signs (and *tangible* ones) that he is a successful practitioner, indicated by the beautiful

Swiss chalet, in a spot of charming scenery, and which exhibits taste of no ordinary quality. His office is a gem of an arrangement, so complete in all its appointments: A reception room, an operating room, and a room containing a second chair and for various purposes, with a *multum in parvo* of a laboratory—seemingly nothing wanting (but the usual disorder and dirt). All these rooms are located in the basement, looking to the south and east out upon a view of art and nature combined which can only be diverting and elevating to the patients, and which is in such contrast to the back-yard views in our cities, which suggest almost anything but heaven, but rather a *cat*-egorical bedlam with promiscuous under-garments of both sexes.

A bountiful collation was served and duly appreciated. Pity on those whom we hear say they are surfeited with dental societies!

AMERICAN MEDICAL ASSOCIATION.

The Section on Dentistry (Sec. 7), of the American Medical Association, met in the Council Chamber, St. Paul, Minn., Tuesday, June 6, at 3 P. M. Dr. D. H. Goodwillie, of New York, called the meeting to order. The section then nominated the following officers, who were subsequently elected: Chairman, Dr. D. H. Goodwillie, New York city; Secretary, Dr. Truman W. Brophy, Chicago.

Dr. Allport offered a resolution that a committee be appointed to whom all papers to be read before the society be referred. Drs. Allport, Brophy and Williams were appointed on this committee.

Dr. William D. Kempton, of Cincinnati, presented a paper on "Oral Hygiene," of which the following is a synopsis:

"From the beginning, the sole aim of practitioners was to discover a cure for disease, and, although sometimes harmful, the medication received the credit. Now, one of the main objects of practitioners is to prevent disease. The profession is indebted to specialists for many, if not most, of these discoveries, as they are more apt to arrive at definite results than those whose attention is occupied with the whole field of medicine. To be successful in the fullest sense of the term, the discoveries of these specialists must be received heartily by the profession at large. Oral Hygiene is a subject of great importance, and the evils arising from the neglect of it are far-reaching. Good, strong teeth are beautiful as well as serviceable, and indicate care; but when we find one whose teeth resemble the charred trunks of stately trees after the fiery scourge has visited the forest, and whose

breath is suggestive of a cesspool, we ask, 'Whence comes this sad havoc?'"

Dr. Kempton then entered into a careful analysis of the teeth, giving their elements and functions, and the "acid theory" of Dr. Geo. Watt. Then followed a list of the evils resulting from diseased teeth, showing that the whole system is more or less affected by their presence.

Dr. Kempton's paper closed with directions for preventing decay in teeth: "Physicians should feel it their duty to point out to their patients the results of neglect of the teeth, and no medical college should consider its curriculum complete unless some attention is paid to the teeth."

The paper was discussed at length by Drs. Williams, Talbot, Allport, Lawrence, Marshall, Goodwillie and others, after which the meeting adjourned until next day.

SECOND DAY, *June 7*.

The section met promptly at 3 o'clock. After the meeting was called to order, the secretary read a paper from Dr. Barrett, of Buffalo, describing a case of abnormal dentition, which he illustrated by plaster casts.

Dr. J. S. Marshall, of Syracuse, N. Y., then read a paper on "The Need of Dental Surgeons in the Army and Navy." He said: The government provides for the care of the soldier in all cases except where his teeth are concerned. Soldiers on the frontier, and sailors on a long cruise, have no opportunity of receiving dental services, no matter how much they may need such attention; and the disease must run its course, being turned over to the bungling of the hospital steward or some less competent person. The treatment of fractures or gun shot injuries of the lower jaw is the same as twenty-five years ago, being much behind the times. The objection to the appointment of dental surgeons in the army and navy is, that the amount of dental diseases is so small as not to require specially educated surgeons to treat them."

Dr. Marshall then gave some statistics showing the relative number of men in the army and navy who, in the years 1878 and 1879, were reported as having needed dental services; also, the opinions of the surgeons-general of the army and navy, Gen. Hancock, and Admiral Porter, relative to the appointment of such surgeons. The paper closed with the recommendation that a committee be appointed by this section to arrange a blank statistical report, covering all the dental

and oral diseases, and request the surgeons-general of the army and navy to incorporate them in the regular medical and surgical reports. The paper was discussed by a number, and Dr. Allport offered the following resolution, which was adopted :

Resolved, "That a committee of three be appointed by the chair to consider the subject of the appointing of dental surgeons in the army and navy ; and that Dr. E. Maynard, of Washington, and the surgeons-general of the army and navy be requested to coöperate with this committee."

Drs. Allport, Marshall, and Williams were appointed on this committee. Dr. Lawrence then presented the following resolution, which was also adopted :

Resolved, "That the chairman of the Section on Dental and Oral Surgery of the American Medical Association appoint a committee whose duty it shall be to investigate the subject of food, including, as far as possible, mastication, insalivation, digestion, assimilation, and the habits of life, in its relation to embryology and development of the different tissues and organs of the human body, and to report at the next annual meeting."

After this resolution had been acted upon, the section adjourned until next day.

Third Day.

The section convened, and was called to order by Chairman Goodwillie, at 3 P. M. By action of the association, the name by which the section is known was changed to the "Department of Dental and Oral Surgery," and as such it will be hereafter known.

The chairman appointed Drs. Lawrence, Talbot, and Kempton on the committee called for by the resolution of Dr. Lawrence, passed the day before.

Dr. E. S. Talbot, of Chicago, read a paper entitled "Injurious Effects of Mercury as used in Dentistry." The following are a few remarks of the speaker : "There can no longer be any doubt that amalgam fillings in teeth will sooner or later produce mercurial poisoning. The dire effects of this metal are not always seen immediately after the fillings are inserted, years sometimes elapsing before the injurious effects were felt and noticed." The history of two well-marked cases was here given by Dr. Talbot : "The amalgam fillings were removed and gutta-percha temporarily inserted, these in turn being substituted by gold ; after which all symptoms of mercurial poisoning disappeared." A detailed account of a series of experiments made by the writer were presented and the subject was passed.

"How Dentists should be Educated" was the subject of a paper by Dr. W. W. Allport, of Chicago. After prefacing his remarks a history of dentistry in the past, Dr. Allport said: "The dental surgeon must be educated both in mechanical dentistry and dental surgery, for no disease can be intelligently treated without a knowledge of the histology, physiology and anatomy of the organs diseased, as well as the pathology, prognosis and rationale of the treatment employed to restore the parts to a healthy condition, and this is *medical science*. The successful dental surgeon mnst have a thorough medical education, in all its branches, supplemented by special instruction in dental surgery."

After listening to a paper on "Dental Science," by Dr. J. B. Lawrence, of New York, the section adjourned to meet in Cleveland the first Tuesday in June, 1883.

BUFFALO MICROSCOPIC CLUB.

The regular monthly meeting of the Microscopical Society was held Tuesday, May 9, at the Central School. . . . The name of Dr. William H. Slacer was proposed, and Mr. Thomas Granby was elected to membership; after which Dr. W. C. Barrett read an interesting paper on the "Bioplasson Doctrine," being the result of examinations made upon the structure of blood corpuscles in conjunction with Dr. Geo. E. Fell and Prof. Kellicott. The question at issue was the structure of the red and white blood corpuscle. Dr. Heitzmann, of New York city, claims to have seen certain appearances in the blood corpuscle—"a fibrillated net-work"—when immersed in a 50 per cent. solution of bi-chromate of potash. Dr. Barrett said he had seen many of these appearances, and gave illustrations of them on the black-board. He also advanced some new views relative to the granular motion inside the corpuscles.

Dr. Geo. E. Fell, who had worked with Dr. Barrett in these observations, and manipulated the instrument, had not so far seen anything corresponding to a fibrillated structure in the blood corpuscles. He rather claimed that the appearances observed confirmed the prevalent theory of a granular formation to the white blood corpuscles. He gave the method of procedure in the examination of the blood. The value of the different kinds of illumination as to central and oblique light with regard to observations of this character, was

shown. While oblique light was really necessary to a satisfactory definition of the *striæ* of the diatoms, for the observation of the blood corpuscle more central rays were required. The necessity of using the test objects of the microscope, to be assured of the correct working of the lenses, before satisfactory work could be performed, was commented upon. The powers used in these examinations were from 600 to 2,400 diameters. The objectives used were two of Spencer's 1-6 "duplex" of 118° and 119° balsam angle, and a 1-16 inch objective of Gundlach's.

Mr. James W. Ward discussed the views presented. He did not coincide with Dr. Heitzmann, and stated that even were a fibrillated structure to be found in the blood corpuscle, we would be no nearer the end to be attained, viz: a knowledge of the structure of protoplasm than before. A new fact would be simply added to science.

Dr. Barrett presented an interesting subject for consideration. He exhibited a series of slides, prepared by Mr. Miller, of Berlin, in which the latter claimed that the *dentinal tubuli* were filled with *bacteria* and *micrococci*—minute animal organisms, which caused the decay of teeth. Dr. Fell and himself had examined the slides and discovered the appearances set forth by Miller, but neither desired to state positively that they were these organisms. The theory heretofore held has been that the decay of teeth was of a chemical nature. If *micrococci* and *bacteria* are founded in the dentinal tubuli, it would tend to upset this theory, and undoubtedly be a great step in advancing the causes of many abnormal conditions of not only the teeth, but the human body at large.

One of the slides which Dr. Barrett exhibited created a new fact not, he thought, hitherto known to science. A slide made from a sound human tooth showed that the enamel and dentine were both penetrated by numbers of fungi of comparatively large size. Commencing at the periphery, these "spross pilz" had pierced the tooth substance diagonally across the enamel rods and the dentinal tubules to a considerable distance. It was not improbable that much of what in tooth caries had heretofore been considered inexplicable, might, in the light of Dr. Miller's observations, be readily accounted for.

Dr. Fell, who represented the Buffalo Club at Elmira, June 20, gave an account of the very successful soiree of the Elmira Microscopical Society. He stated that the people of Elmira were working with great enthusiasm to make the coming meeting of the American Society of Microscopists, to be held at Elmira in August next, the

most successful meeting of the society yet held. He also reported the meeting of the executive committee of the National Society at Elmira, Aug. 21st. From the character of the papers already offered, the scientific value of the meeting is certainly assured.

Dr. LUCIUS HOWE read a paper from Max Shultze, of Vienna, in which the latter coincided with Mr. Henry Mills and Prof. D. S. Kellicott relative to the structure of the fresh water sponge. Mr. Carter, of England, high authority on the history of the *Spongiadæ*, or fresh water sponges, had gracefully backed down and acknowledged his error in certain points of structure relating thereto.

Dr. BARKER, who had expected to present the paper of the evening, on Histology, owing to lack of time, was excused for the time being.

It may be well to mention that the regular meetings of the Microscopic Club are held the second Tuesday evening in each month, at the Central school building. Any one interested in thc work of the Club, is cordially invited to attend the meetings.

LEE H. SMITH, *Secretary.*

The Microscope.

MERRIMACK VALLEY DENTAL SOCIETY.

The nineteenth semi-annual meeting of the Merrimack Valley Dental Society was held at the Parker House, in Boston, on Thursday and Friday, May 4 and 5, the president, Dr. R. R. Andrews, of Cambridge, in the chair. A committee was appointed to draft resolutions upon the decease of Dr. Morgan, of Gray, Me., and Dr. Perkins, of Amesbury, Mass.

The question of repairing gold fillings with other material was taken up and discussed.

Dr. C. H. Osgood spoke in favor of the use of amalgam for that purpose. He had used it ten years with success. He advised the use of rubber for a covering for the pestle in preparing the amalgam.

Dr. Wetherbee thought there was no objection to using amalgam for repairing gold fillings when it would not show. He thought where gold fillings needed repairing the most, was at the cervical wall, and this was due more to the making of deep undercuts than to the use of the mallet.

Dr. Baker asked what success members had met with in the use of adamantine stopping.

Dr. Searle had used it, but could not vouch for its durability.

Dr. Stockwell favored the use of gold and amalgam in the same cavity, stating, as the result of his observations, that the result attained was better than where one material alone was used, and wished to know—if this is true—why it is so.

Dr. Chandler said the gold absorbed surplus mercury.

Dr. Kidder said the silver in amalgam was the true cause of the blackness of fillings, and that the less silver used, and yet retain sufficient hardness, the better the filling would be.

Dr. Waters said the action of the acids upon the amalgam filling, instead of the tooth substance, is the reason for better preservation of tooth substance by amalgam.

Dr. Kidder read a paper on the use of Compound Fillings, and recommended the use of a solution of resin in ether for retaining the first piece of gold or gutta-percha, so as to avoid the making of retaining pits or undercuts at the cervical wall.

The question of "Transplanting and Replanting Teeth" was then discussed.

Dr. Waters spoke of his continued success in both cases.

Dr. Osgood objected to the practice of replantation, because of the danger of inoculating the patient with syphilis, citing a case where it had occurred.

Dr. Searle reported some successful cases of replantation in his practice.

Dr. Palmer was not in favor of transplantation. He cited a case of *plantation* of an upper incisor tooth, made from pitch-pine, and shaped to resemble the lost tooth, which was inserted the day after extraction, and remained four years.

The first part of the ensuing session was devoted to an exhibition of very interesting microscopical objects by Drs. Waters, Andrews, Wetherbee and Blodgett, the latter showing the circulation in the tongue of the frog, and Dr. Andrews exhibited some very fine specimens, showing the different stages of growth of the enamel organs in the embryo of the hog.

Dr. Dudley spoke favorably concerning the N. E. Dental Journal as a publication worthy of the support of the dental profession, and introduced Dr. Stockwell, who explained the objects and purposes of the Journal.

Dr. Dudley made an address upon the subject, "What shall be the Future of this Society," advising, among other things, that the name

be changed to the New England Dental Society, and that only annual meetings be held; that, the next meeting being the twentieth annual meeting, an effort be made to get together all of the old members of the society. The subject was discussed by various members, and an informal vote taken to ascertain the sentiment of the society as to the feasibility of adopting the proposed changes. The sentiment was found to be, with a single exception, unanimous for the proposed plan. A committee was appointed to make such changes in the constitution and by-laws as will be necessary in order to effect the changes suggested.

Dr. Stevens showed a disk punch used by him for the making of paper disks, and recommended it to the profession.

Dr. Dudley spoke of the advantage of the English artificial teeth over the American, because they are made of one body and can therefore be ground away and repolished without trouble. Dr. Dudley also recommended the use for casts the metal known as Spencer's metal.

It was voted that the next meeting be held in Boston, and that the evening session be devoted to a social meeting, with a collation.

THE RHODE ISLAND DENTAL SOCIETY.

The fifth annual meeting of this organization was held Tuesday, July 4, at Newport, at the office of Dr. S. E. Greene. There was a good attendance of members from different parts of the State. The annual report of the secretary showed a good condition of the affairs of the society, and the treasurer's report stated an increased balance in the society's funds. Essays were read by Dr. J. W. Smith, of Newport, on "Artificial Crowns," and by Dr. L. L. Buckland, of Providence, on "Work and Play." Both papers were carefully prepared, and they were listened to by the members present with pleasure and profit.

Officers for the ensuing year were elected as follows: President, Dr. W. H. Thornton, of Providence; Vice President, Dr. S. E. Greene, Newport; Secretary, Dr. L. L. Buckland, Providence; Treasurer, Dr. J. W. Smith, Newport; Librarian, Dr. W. L. Church, Providence; Executive Committee, Dr. G. H. Ames, Providence; Dr. A. D. Roberts, Woonsocket; Dr. J. W. Smith, Newport.

The society holds regular meetings on the first Tuesdays of January, April, July and October, in each year. After adjournment, such

of the members as could arrange to do so, joined in a dinner together at the Aquidneck, and later a smaller party started for the Rangeley Lakes, Maine, for a brief respite from the cares of practice.

Harvard Odontological Society.—The fourth annual meeting of the Harvard Odontological Society was held Saturday afternoon and evening, July 1, 1882, at Young's Hotel, Boston, the president, Dr. Eugene H. Smith, in the chair.

The annual address was delivered by Dr. Frank Perrin, followed by an essay by Dr. J. W. Smith, of Newport, R. I., who described a very ingenious method for "artificial tooth crowns." At the dinner remarks were made by the president, and toasts responded to by members of the society.

The following officers were chosen for the ensuing year: President, Eugene H. Smith, D. M. D.; Recording Secretary, F. E. Banfield, D. M. D.; Treasurer, Frank Perrin, D. M. D.

Executive Committee—F. E. Banfield, D. M. D.; D. F. Whitten, D. M. D.; E. C. Briggs, M. D., D. M. D.

F. E. BANFIELD, *Recording Secretary.*

EDITORIAL.

Some time since we wrote an editorial notice in relation to the appointment of Dr. R. B. Winder to the position of Dean of the Baltimore College of Dental Surgery, but by some mishap it got mislaid and was overlooked. Dr. Winder takes the place in this old college made vacant by the resignation of Dr. Gorgas. The announcement of this college may be found in the advertising columns of this number of the *Journal*. Dr. Winders' address is 140 Park avenue, Baltimore, Md.

We are very glad to be able to report that Dr. Marshall H. Webb is steadily, if slowly, gaining. At last accounts he was able to leave his bed for a few moments. In this number will be found an article from his pen which will be read with pleasure by all his friends, both for its own merit, and because it is a pleasing evidence of returning strength.

On account of the large amount of society reports, our *editorial* and other matter in this number must be, of necessity, limited. We cheerfully make room for them for two especial reasons: First, because of their value, and secondly, we are gratified to know that so many societies are disposed to make the *Journal* a "mouth-piece." We are sorry that any must lay over till next month.

A NOT QUITE SCIENTIFIC CRITIC.

The Ohio State Journal of July, 1882, contains in an article: A Scientific Editor—a criticism of my article on the Rare Metals. It is my habit not to answer criticisms unless they are good, and from this standpoint I would also refrain answering this criticism (?); but the authoritativeness with which errors in this article are paraded as test facts, deserves a careful answer.

I made the guarded and perfectly scientific statement that to the thinking chemist a decaying tooth is an "I do not know."

Dr. Watts, whom I suspect to be the critic, perfectly overlooks that I say "to the *thinking chemist*," and that the *chemistry of decay* is unknown. We all know a good deal about the histology, a trifle about the etiology, little about prevention, and much about treatment, but about the *chemistry of decay*, with the permission of the Ohio critic, we know nothing. The critic thinks that the time one is employed in a certain business gives any right to judge about things concerning the business in another line. A teacher of geology may never have traded in coal or iron-ore, yet he can give a far better opinion about the value, nature, etc., of the coal, than the tradesman who has been in the business for perhaps forty years in the store, whilst the professor studied and analyzed only about one day this coal, but may know thousand times more. This to give to the critic the point of difference between the chemist whose line of business is different from that of the microscopist or practical dentist, though working on the same object. The Ohio critic reasons quite youthfully in coming to the conclusion about the acid which dissolves the tooth:

"Only a few acids are ordinarily found in the fluids of the mouth. Let our friend, the 'scientific editor,' apply the logic of exclusion, or reduction to unity, to these, and he will soon find which are the guilty acids, whose guilt he can readily demonstrate by analysis. Take, for example, that variety of dental caries known as chemical abrasion. Several acids found in the buccal fluids do not corrode the teeth. These are ruled out at once. Then, in abrasion, no decomposed

tooth substance remains in contact with the diseased surface. The reagent is able to dissolve tooth material. The dentine not yet acted on is normal on the very outer surface of the abrasion. The agent must be able to dissolve earthy and organic matter with equal facility. This rules out sulphuric, nitric, hydrochloric, malic, citric and many other acids. Pushing the research still further, it is found that but two acids ever known to be found in the buccal fluids, are capable of dissolving all the tooth materials with equal facility, so that, as far as the action goes, all of the tooth is dissolved, and these two are lactic and acetic acids. If abrasion is found on the teeth of young persons it is generally due to the action of acetic acid, and if found with elderly patients, especially if they are rheumatic, or if they chew tobacco, the action is commonly caused by lactic acid. And when the abrasion is recent, it is not hard to find acetates or lactates, or both, in the mouth.

The same general principles may be applied to the consideration of each of the other three varieties of dental caries, but this item is already much too long."

May the reader judge himself about the beautiful logic in this passage.

First: We say a "decaying tooth." The critic speaks of abrasion, a relatively simple and easily explainable form of waste of the teeth, but no decay. Between abrasion and decay there is the same radical difference as between dissolving the skin by dipping it in caustic lye and losing it by an ulcer, a cancer, or some such histological-physiological process.

That lactic and acetic acids dissolve any easier the whole tooth-substance than hydrochloric acid, is wrong. If we employ the two acids concentrated, we do not have the natural conditions of the mouth; and if we give them weak, they are not superior to hydrochloric acid, etc.

How easily the author says: "With elderly patients, especially if they are rheumatic, or if they chew tobacco, the action is commonly caused by lactic acid."

How did the author prove lactic acid even in this case of abrasion —not speaking of decay—about which I wrote in my criticised article? Has he ever proved it? Please give us the receipt how to test exactly for lactate of lime in the mouth in these cases. We must confess we failed several times in attempting to test for small quantities of lactic acid when we knew it was there.* The critic seems to labor under the illusion that one of the couple of dozens of acids he remembers from

*Lactate of zinc, although the most characteristic salt, is little characteristic.

the chemical studies of his college time, must do the mischief, but all he can bring as proof of it is words, no facts—then he only speaks of *abrasion.*

But now to *decay.*

My opinion about *decay*, that is, the common ulcer-like cavity, has been clear since I commenced to study chemical fact in relation to dentistry. A priori, one would think a chemist ought to be in favor of all the paraphernalia of acids, alkalis, etc.; but only the chemist who "knows all about it" (?), that is, who thinks science never advances, will bring his chemical work-shop into the cavity of the tooth.

I consider decay a physiological process—the older school would severely criticise me for not saying pathological process; but the difference between these two words is only subjective, not exact and scientific. The decay is an *ulcer* only modified by the difference of tissue. The chief factor probably in starting, and more probably maintaining of the ulcer are low organisms belonging to the protists, like bacteria, leptothrix, etc. The lime-salts are not dissolved, or at least only a fraction, but are carried away and comminuted mechanically.

What give the tooth its hardness? "What an ignorant question!" Well, please, doctor, to answer it well in the next number, and I should feel glad if we agree. The explanation of the difference between the decayed mass and the healthy tooth depends on this answer.

But a few experiments!

Experiments are what we want, not empty words. Dr. Stockwell lately extracted sixteen teeth from one mouth, all badly decayed. I scraped the decay carefully from the cavities of the teeth and made three sets of experiments.

First: I determined the lime-salts in the outer black mass, which was quite soft.

Second: I determined the amount of lime-salts in the soft white mass at the bottom of the cavity.

Thirdly: I took a small splinter of dentine from every tooth, from which I took decay and determined the lime-salts.

RESULTS.

	Actual weight.	*Lime-salts.*
1 Black soft decay,	21.6 mgrs. (⅓grain)	62 p. c.
2 White soft powder,	10.4 "	73 p. c.*
3 Healthy dentine of same tooth,	26.4 "	72 p. c.

*These figures are not quite correct, as some zinc-oxide was mixed with the lime-salts, probably from an old oxy-filling—1 mgr.=$\frac{1}{60}$ grain.

All the specimens were first most carefully dried in the water bath, so as to have a standard, and the weight refers to this dry state. The balance was excellent—giving $\frac{1}{20}$ mgr. or $\frac{1}{1200}$ of a grain—and the whole done as carefully as possible.

These experiments—omitting No. 2—teach :

1. That the lime-salts are only slightly diminished in the decayed mass compared with the healthy tooth ; hence, that no acid can have produced that state of affairs, because every acid dissolves so very much easier lime-salts than connective tissue.

2. That the chief difference between healthy and decayed dentine is at the outside, but not at the boundary-line of decay.

I made some further experiments :

Not the very slightest traces of an acetate were in the decayed masses.

The lime-salts were *the same* in the decayed masses as in healthy dentine—carbonates and phosphates. How easily acetic acid dissolves the phosphate of lime of the tooth, and how it would disappear from the decayed mass if any such or a similar acid was acting, was shown by the following experiment :

A mass of decay (about $\frac{1}{3}$ of a grain) was treated with ten drops of vinegar—made artificially from acetic acid and water to keep it free from phosphates—for two minutes ; after this time it had dissolved enough phosphate of lime to give a strong, yellow turbidity with molydate of ammonia. Thus far, facts. I shall give more if the critic will have told me what makes the teeth hard.

Who was the "sutor ultra crepidam ?" The Ohio critic, who thinks he can have a weighty word in *real* modern chemistry with the few acids at the disposal of his chemical knowledge, or I, who know well my "crepida," and did ply nothing but chemistry without entering into practical dentistry, in which my Ohio critic, as far as I know, may be as strong and careful as I am in chemistry ; he in chemistry and I in practical dentistry would make a poor show, but the points here under discussion are neutral ground—physiology, histology, biology, etc., and there the quality of work rather counts than the time one has spent for it, or the mechanical skill of long and valuable experience.

CH. M.

Operating Table and Laboratory.

TO ARREST HEMORRHAGE.

So accustomed are dentists to apply the various remedies directly to the rupture, in case of hemorrhage, that a remedy to be taken *internally* may seem at once as grossly heterodox. External applications, however, do not always succeed as readily as we could wish, to say the least. Cases are by no means rare where hemorrhage, following the extraction of teeth, is exceedingly troublesome, and defies for hours all external applications. Acting upon the advice of a prominent physician we have, of late, used gallic acid internally and, thus far, with prompt and gratifying success.

If the flow is considerable and persistent, we take of the crystals about one-half teaspoonful to which we add three or four ounces of water; thoroughly mix and administer at once. This is to be followed by teaspoonful doses of the same strength every fifteen minutes as long as necessary. The physician referred to has used it with uniform success for many years in all cases, from hemorrhage of the lungs to nose-bleeding. It is perfectly safe and harmless thus given. The acid so affects the blood as to produce coagulation upon its coming to the air, thus forming a hard clot at the point of rupture.

So satisfactory has been our experience with it, and so uniformly successful is its use in general medical practice, that we feel confident of its advantage in dentistry. Try it and report. S.

ZINC vs. BABBITT METAL.

Thirty years ago a partner of mine, Dr. D. H. Goodno, after experimenting with all the metals ever used for dental dies, and finding nothing satisfactory, at last thought that "Babbitt metal," then but little known, might answer the purpose. He tried it, and found, to his great relief, that it was just what was needed. We adopted it at once, and after having used it exclusively all these years, can say it is a *perfect thing* for the purpose. And why should it not be? It has all the requirements needed, viz.: *non-shrinking, hardness, toughness*, smoothness, and melting at a low temperature. Now, while *zinc* is *hard*, its shrinkage is a serious objection. *Type-metal* does not shrink, but is too brittle.

But it is necessary that the Babbitt metal should be made from a

correct formula. Much that is sold, while it answers the purpose for which it is generally used, viz.: bearings for machinery, is made in such a manner that it is too soft for dies. Metal that costs less than forty cents per pound will not answer, for it can't be made and sold for less.

To ensure a good article, make it yourself, as follows:

Copper, 1 part;
Antimony, 2 parts;
Tin, 8 parts.

Melt in a crucible, *in the order named*, turning off as soon as the tin is dropped in, and remelt. The S. S. White Co. is now making from the above formula.

For counter die, use seven parts lead and one part tin, and don't turn too hot; coat the die with whiting.

For convenience, moisten the sand with sweet-oil, as it is then always ready for use, and there will be no danger of your cast being spoiled from excess of moisture.

I seldom make the second die, even in sharp, irregular, lower cases. The plate will *always* fit the plaster model, and if that is correct, will, of course, fit the mouth. It is time that zinc was banished from dental laboratories, books of instruction and colleges. There is no more need of it than of the "fifth wheel to a coach." On the other hand, it is simply a nuisance, as any one will say after following the above directions half a dozen times.

L. P. HASKELL, Chicago, Ill.

Probably every operator has noticed frequent cases, where ether is being administered, of marked, early and transient, or what is termed the *primary action* of the drug. We do not remember to have read any extended account of operations being performed under this condition, and so jot down these few lines. We have made no extended experiments in this direction, though we believe the field a promising one, and trust that this article may be the means of leading some to enter it, or of bringing thoughts or suggestions from those who have already explored the same. Of course, only slight or minor operations can be performed under this condition, but it is possible many times to remove several teeth with but little if any consciousness. We have removed one or two teeth, without the least consciousness, in three minutes or less from the commencement of inhalation to com-

plete restoration to consciousness. The primary action usually results in from one to five minues, and experience best teaches one when it is *just the right time to operate.*

We would suggest, first get the patient perfectly quiet from excitement and (if they are willing to take the risk of a little pain, the prospect is all the more favorable) present the ether rapidly. Watch the pulse, respiration, and the whole appearance; in fact, be *wide awake.* It is surprising how quickly the *appearance* of *complete* anesthesia will be produced. Have the patient held firmly, and pay no more regard to manifestations of pain than you would under the action of nitrous oxide. If you are sure the patient really suffers, a few more inhalations will usually bring another period of unconsciousness, when the operation can be completed. In our experience, there are cases when we much prefer this method to the use of gas, both as regards safety and also the comfort of the patient. For a difficult case in extracting several teeth, we would of course not advise this method; neither would we in other cases where the indications are that the patient would be unmanageable, but simply in those cases where your judgment tells you it is the thing. Let members of the profession be heard from through our columns.

To prevent nausea when taking impressions let the patient rinse the mouth thoroughly with camphor and water; five drops of spirits of camphor to a wine-glass of water is sufficient in most cases. Have used it so long and so successfully that we supposed everybody used it until a few days since, when in conversation with several dentists we learned that no one of the number had ever tried it. One suggested that "it perhaps gave the mucous membrane something else to think of for the time being."

What I am told about mechanical and chemical action and compatbility, is no object for observation for me; neither of these expressions is correct. *So long as a tooth is alive the foreign body that comes in contact with dentine will irritate.* As to chemical action, I do not know whether such a thing does exist in the relation between the dentine and the filling material. Where there is plenty of living matter, as in deciduous teeth, the irritation upon a solid filling will be more intense than upon a filling of soft, protective material. I recommend light filling material in deciduous teeth, for the reason that we have more living matter in them. HEITZMANN.

THE

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SOCIETIES.

IMPARTIAL IMPRESSIONS FROM THE MEETING OF THE AMERICAN DENTAL ASSOCIATION, AT CINCINNATI, AUGUST 1-4, 1882.

If we shall have at heart anything but the good and progress of the profession, and if we had any personal interest in what dentists as a body do, we would not say a word about the meeting; but as we are a perfect outsider, with no likes and dislikes as far as business is concerned, we hope that these remarks may be taken for what they are intended to be—notes of a reporter, given for the best interest of the profession as a whole.

The meeting was one of the few in America where we could not find that idiotic division into democrats and republicans. Politics were completely, and personal spite almost entirely absent; but there was present a good healthy discordance of opinions, which insured interesting proceedings. The battle-cries of Here, Guelphs! Here, Ghibellins! Here, Believers! Here, Knowers! were heard many times, and the partisans of the respective ideas rallied around the banners. Very strong, we might say exceptionally strong, is the old guard—men who have become gray in practical work, who have nearly half a

century of experience to rely upon; the old guard is truly of the type which is never conquered, which only dies. Though not quite a representative of the old guard, foremost among them is W. H. ATKINSON. He is the truly fighting member of the society; he never has ceased to learn; new ideas find hardly a warmer supporter among the youngest members than in W. H. Atkinson. When he rises up, divests himself of his superfluous coat, to give his enthusiasm free range, and then with an astonishing strength pours forth his ideas—sometimes perhaps in a rich garment which makes it difficult for less enthusiastic mortals to recognize the truth clad in it—all listen, all are carried by the ardor and the love of truth which every one, even he who does not understand him, sees and hears in his words and actions. Without Atkinson, a meeting would seem to us to lack one eminent factor—enthusiasm. Quite different from him is Dr. GEORGE WATT, the editor of the Ohio Journal. While sitting at his table, taking notes, he appears very quiet, very calm, not showing much excitement; but let him rise, and a smile will pass through the assembly. They know that sharp, clear and witty sayings may be expected. He is one of the clearest and most precise speakers at the meeting; one knows what he means to say, and one of the reasons that his opinions meet with either stronger approval or stronger opposition than those of others, is because you know what you have to accept or what you have to oppose. His tall, square build and measured movements inspire confidence. He has been at many meetings and fought many battles, there is no doubt.

A very influential member of the meeting is Dr. W. H. MORGAN, of Nashville, Tennessee—a portly gentleman, with deep, piercing eyes. His experience and long practice are hard to stand against; with him, one gets the impression of deep, pious convictions, which are allowed rather greater sway than our perception of facts would seem to us to warrant. His convictions are easily touched and aroused.

Another of the most active older members of the meeting is Dr. T. L. BUCKINGHAM, of Philadelphia. He took part in the discussion of almost every subject, but just with him the unfortunate acoustic circumstances were more felt than with any other. The size of the hall on the top of a hill, open windows, an organ practising in the basement, rendered the hall extremely inacoustic. Several of the older members seemed to be slightly troubled by defects of the ear. This, added to the unfavorable local circumstances, produced a great number of misunderstandings. As a consequence, if the listening members of such a

meeting do not hear clearly what a speaker says, they become distracted, engage in private conversation, etc. This in its turn again does not increase the audibility of the speaker; the president's gavel is heard—by the way, hardly too often—and thus we were so unfortunate as not to understand one-fifth of what Dr. Buckingham said. He seemed to suffer the same difficulty of not hearing clearly the preceding speaker, as some answers showed. We do not doubt that much valuable truth and information was blown through Highland House Hall over the Ohio valley without reaching the ear of those for whom it was intended. There were some excellent listeners in the whole assembly, and without a good listener there is no good speaker; and to them a good deal of the success will always be due.

"Modest" Chicago sent Dr. Alport, to be represented in a worthy manner. He is a practical Westerner, and does not talk much about theories and metaphysics. He has a slight sarcasm, always pleasing, in the corners of his mouth. Of course, all the ages are represented at the Congress, but those above the middle age seem to be prevalent.

Coming to the younger group, we meet a "Doppelgänger" of the President of the U. S. in Dr. W. C. Barrett, of New York. He is an excellent presiding officer, with a good voice and strong hand for the gavel.

Dr. H. A. Smith, the president of the meeting, a slightly gray gentleman, with a gray mustache, but without the conventional heavy beard, gave to the Association a good business president, who does not lose his self-possession.

Dr. C. N. Peirce, of Philadelphia, wears the peculiar soft, well-cultivated hair one expects among favorable surroundings. He is one of those who talk to the point. It is really pleasing that the Society has a great number of such members. The tendency not to talk to the point is not very great, at least not among the middle-aged, practical men. That leads us to Dr. Crouse, of Chicago, the most business-like man of the meeting. He might be mistaken for a Maine Yankee, but he is not, though every word he says is business, and you hear it; he has a clear, ringing, fine voice, that sounds like a bugle for the charge.

Dr. G. F. Friedrichs, of New Orleans, who was acting as presiding officer during the morning session, is also a speaker who means business when he says something. Under circumstances, the office of a president of a meeting has seemed to us quite difficult.

Dr. Kulp might be suspected to be a rich financier of Europe. He has the typical bodily development of such an one. He might walk

any time into the Exchange at Paris or Frankfort, and never be asked his card of admission; and yet he speaks clearly about teeth and the dental schools, and not at all about the Suez shares or Chic. & N. W.

Dr. W. H. Dorrance, of Ann Arbor, is a modest man, who knows more than at first sight you might think. He seemed to surprise the meeting by the many good things he had to say Friday. They did not know that so much was stored up in a gentleman who never, when the subject of dental pathology was up, spoke about mythological problems belonging so very fitly (?) to the subject.

Dr. F. M. Odell is not yet old, and one of the working men of the Association. "One of my pupils," says W. H. A. Well, he has reason to be proud, indeed. Dr. Odell said truly: "All we know is empiricism, and nothing but empiricism." The only trouble is, that the word has assumed a wrong taste, making it often identical with quackery, while it really means nothing but experiment and experience.

It seems to us that the younger men in the Association did not take part in the meeting as they ought to have done. A hunters' saying is: "That dog will be the best who the earliest engages in fight with foxes and is bitten the most." From that stand-point, nothing is as good as a slight defeat when young. It gives you a warning where you are weak, and time to remedy. We are sorry that so few of the younger members showed themselves as speakers in the meeting.

Dr. Rawls, of Lexington, with Southern courage, drove his opinion into the camp of the enemy. He is as fine a speaker as any, full of enthusiasm and dash; and, aided by a good voice and personal appearance, he sooner or later will become prominent among the profession.

Dr. Morgan, Jr., of Nashville, the very copy of the father, only about thirty years younger, is an excellent listener, but we would not venture to say that he is not an excellent speaker.

Another professor of Vanderbilt University, at Nashville, Tenn., Dr. Stubblefield, was taken sick the second day, and, though granted the privilege of the floor, could not take part in the discussion.

Among the quiet but very effective members of the meeting, was the secretary, Dr. Geo. H. Cushing, of Chicago—a gentleman of majestic appearance, strictly attending to business.

In Dr. Taft we had one of the sharpest speakers. He enjoys quite a straight upper lip.

Last, not least, Dr. L. D. Shepard, of Boston, of as great experience, practical skill and clearness of language as any member in the meet-

ing. Very few show such enthusiasm in their profession as the D. D. S. from Boston.

While, as far as persons were concerned, the meeting of the Congress showed an immense amount of learning, experience and debating skill; as a whole, it struck us that the business done by this large gathering of knowledge did not come up to the forces engaged in it. The great difficulty with some of the most influential men seems to be to talk to the point and to submit their opinions for a moment to that of the more managing members. Some subjects took an immoderately large amount of time, while others had to be slurred over from lack of time. The very unimportant nomenclature occupied an entire meeting, just as the almost hopeless subject of dental education; but pathology, histology and physiology were crammed out of their respective importance by some speakers soaring off into metaphysics without sufficient provocation. Dr. Atkinson truly said, after the second afternoon session: "If we talk about these things at a small private meeting, where there are not more than five, we may come to a satisfactory agreement; but to settle the matter here, is a hopeless attempt." The subject of helping certain investigations by financial aid required one entire session, without the amount of money warranting such an abundance of words. Many members of the Association seemed to us in this point to consider this Association a savings institution rather than a scientific body. What will the Association do with money, if not use it for scientific purposes? We do not think the sum of $200, for investigating the "cause of caries," will prove a great stimulus to an investigator. He must have at least $20,000 worth of self-denying power and love for truth to offset the small amount of hard cash he is likely to get; but a little he will always want and like.

At the last meeting Dr. GODDARD, the new president, was installed. If ever age gives venerability, we have a representation of this in the president of the next meeting. His white hair and flowing beard show wisdom gathered during a long life.

To offset the acoustic disadvantage, the meeting enjoyed a hearty hospitality. An organ concert, in Music Hall, which imitated the roaring thunder-storm with a strength we never heard before, got the approval of the rain-making forces so that they furnished gratis the rain to the thunder-storm; both coincided so marvelously, that it shows strikingly how chance-coincidences will occur. The concert was followed by a drive through Burnet Woods for those who had not yet

been there. We saw the cottages of all the coming presidents in the U. S., from number 1-50.

Thursday evening, August 3, a banquet was given at the "Zoo," as the slang at Cincinnati calls the Zoological Gardens. More speeches, more hospitality. Never any speaker gets caught as badly as in being forced to make an after-supper speech. Oh, if only all of us had those inspirations by the presence of the ladies, of which Dr. Atkinson can boast! The local doctors did everything to make the city agreeable to the stranger.

The strong voice and graceful movements of Dr. Goddard at the "Zoo"—there was dancing at 9 P. M., the new president showing off very favorably among the fair sex—indicate that the forces of life have not been squandered during his long life career.

Twenty-Second Annual Meeting of the American Dental Association,

At Cincinnati, Ohio, Aug. 1, 2, 3 and 4, 1882.

[NOTE.—We were not represented the first day of the meeting, hence have to take the report of it from the Cincinnati Gazette, which report the secretary, Dr. G. W. Cushing, declared excellent at the morning session of Wednesday, Aug. 2d. For the sake of completeness, we copy it with but few changes.]

FIRST DAY—TUESDAY, AUGUST 1, 1882.

MORNING SESSION.

Dr. H. A. Smith, President of the Association, presided, and Dr. George W. Cushing acted as secretary. The officers of the executive committee were well represented. Following is a list of the permanent members and delegates present:

Otto Arnold, W. D. Kempton, J. R. Callahan, Mississippi Valley Association of Dental Surgeons; E. G. Betty. J. H. Boger, Ira Brown, C. H. James, J. Williams, C. J. Kelly, W. P. Horton, George Watt, Ohio State Dental Society; C. A. Pierce, E. T. Darby, Pennsylvania State Dental Society; A. W. Harlan, G. H. Cushing, J. M. Hurtt, Jos. W. Cormany, K. B. Davis, Illinois State Dental Society; W. W. Evans, Washington City Dental Association; Geo. J. Friedrichs, New Orleans Odontological Society; W. H. Truman, T. L. Buckingham, Pennsylvania Association of Dental Surgeons; S. B. Brown, P. G. C. Hunt, Indiana State Dental Association; J. A. Robinson, George R. Thomas, E. C. Moore, W. H. Dorrance, Michigan State Dental Association; T. C. Leiter, Frank Waldron, J. G. Templeton, Gale French, Northern Ohio Dental Association; C. M. Wright, A. G. Rose, G. W. Smith, O. V. Heise, Cincinnati Dental Association; W. H. Eames,

Missouri Dental College; J. N. Crouse, Chicago Dental Society; H. Cowie, Detroit Dental Association; H. W. Arthur, Odontological Society of Western Pennsylvania; W. N. Morrison, St. Louis Dental Society; J. G. Harper, A. H. Fuller, G. L. Shepard, Wisconsin State Dental Association; Wm. H. Atkinson, New York; W. H. Morgan, Nashville, Tenn.; H. J. McKellops, St. Louis, Mo.; Geo. W. Keely, Oxford, O.; C. A. Barrett, Buffalo, N. Y.; F. H. Rehwinkel, Chillicothe, O.; L. D. Shepard, Boston, Mass.; H. J. Smith, Cincinnati, O.; W. H. Findenberg, Pittsburg Dental Association; W. C. Wendell, B. G. Marklein, Wisconsin State Dental Society; D. J. Pollock, Sterling, Ill.; S. A. Garber, Iowa State Dental Society; G. F. Nevins, of Indiana State Dental Association.

The session was opened by Dr. Wm. H. Morgan. On behalf of the dental profession of Cincinnati, Dr. A. Berry, of the city, delivered an address, in substance, as follows:

The partiality of his brethren had imposed on him the pleasing duty of welcoming them to the Queen City. From the position of the city, the center of the population of the country, it was convenient for conventions to meet here, and it was fast acquiring the name of the city of conventions. Much of the progress of the dental profession was due to American dentistry, whose preëminence was acknowledged the world over. It was not to be forgotten that the greatest discovery in modern times in surgery—anæsthesia—was a discovery of their profession. During the sixteen years which had elapsed since they held their annnal convention here, the dental societies and dental colleges of the country had more than doubled their number. While in these years all other departments of science had made important advances, the dental profession had perhaps outstripped them all. This was formally acknowledged last year by those best able to decide. The American Medical Association and the International Medical Congress had recognized dentists as belonging to the fraternity engaged in the practice of the healing art. Cincinnati was recognized for its steady improvement in public enterprises. Here had been founded the second dental college in the world, and here had been organized the Mississippi Valley Dental Association, which for more than a score of years had been the oldest dental society in existence.

Dr. C. W. Barrett, of Buffalo, N. Y., on behalf of the Association, was requested to make the response. He said they had all heard of the enterprise and the greatness of the city. But although admiring this, they had come for a different purpose—that of welcoming each other in the name of dental science. Nor did they come as stran-

gers, for everywhere there was a brotherhood among men of intelligence, and those in honest pursuit of the truth.

Drs. Field, Buckingham and Taft were appointed a committee to draft suitable resolutions on the death of Dr. D. Hawxhurst, who was formerly a member of the Association, and who died in Paris last winter.

On motion of Dr. Barrett, the secretary was instructed to send the sympathies of the Society by telegram to Dr. Marshall H. Webb, Lancaster, Pa., who is lying dangerously ill.

Drs. Crouse, Shepard and Pierce were appointed a committee to draft resolutions on the death of Dr. M. S. Dean, of Chicago, Ill.

On motion, the amendment to the constitution offered last year by Dr. Shepard, was adopted as follows:

To amend Article IV. of the constitution so as to make the present article Section 1, and to add a section, as follows: Section 2. The officers may, for extraordinary reasons, change the time and place of meeting upon the written consent of ten of the fifteen officers.

Afternoon Session.

This session commenced at 2.30 o'clock, with President Smith in the chair. By this time over one hundred delegates had arrived, and with the representatives of the profession from the city, and the visitors, the attendance was about 150.

Dr. H. A. Smith, President of the Association, read the annual address, which presents the following points:

During the past year they had to record the death of one of their most valued associates—M. S. Dean. His death might not, perhaps, be regarded as an irreparable loss, yet when they remembered his genial, plain and generous nature, his cheerful and animated conversation, the variety of his attainments, the extent and accuracy of his professional knowledge, coupled, as it was, with the modest self-estimate and humility of mind so characteristic of him; when they referred to the valuable contributions from him which graced the pages of their transactions, and added to the bulk of their real knowledge; recalling the great love which he bore for the Association, as manifested in the ever-watchful guardianship of its interests, whether a humble worker in its body or its honored president, surely the place in their Association made vacant by the death of Dr. Dean would be a difficult one to fill. In his address last year, the president had called attention to the fact that etiology—the sciences of the

causes of dental caries—had been almost wholly neglected by essayists who had contributed to the proceedings of the Association, and suggested to the section embracing etiology that a committee be appointed for the object of making a careful, systematic study of the causes which contribute to the existence of dental caries. When it was considered that much the larger proportion of their time spent in actual practice was occupied in the treatment of lesions caused by the almost universally prevalent diseases, which were denominated dental caries, and that notwithstanding the subject had been extensively studied, the fact confronted them that the efficient cause of dental caries was still a matter for speculation. It was noteworthy, as well as encouraging, that the subject received so large a share of attention before the section devoted to the consideration of diseases of the teeth at the International Medical Congress, held in London last year. With the view of stimulating investigation in this direction, he would respectfully suggest that the Association offer a prize to members, of not less than $200, for the best paper based strictly upon original investigation relating to etiology of dental caries, the award to be made and announced at the annual meeting in 1884. If there was any deficiency in the treasury for that purpose, it might be met by an increase in the annual membership fee, or the whole amount may be made up by voluntary subscriptions of the members. Whether dentistry should be taught in special colleges or in a regular university course with other studies, was a matter that might safely be left to time, the great arbiter of all things.

Reports of the different sections were called for, but in every instance the chairman of the respective committee urged some reason for not being quite ready to make a report, until section three, which came last, was announced. The chairman, Dr. W. H. Atkinson, of New York, said he was ready to read a paper on "Dental Literature and Nomenclature."

Dr. Atkinson is a veteran in the dental profession. His reputation stands the very highest, and he is said to be well versed on every subject connected with the science of medicine. He practiced in Cleveland many years ago, since which time he has been a resident of New York city. He has a venerable appearance. His great piercing eyes show depth of thought and clearness of mind, and the expression about his mouth and the general lineaments of his face would indicate a strong character. He wears a long beard, nearly gray, and his hair hangs down to his shoulders in poetic fashion. Dr. Atkinson is

considered by some of his confreres to hold eccentric views on certain subjects.

In his paper, he endeavored to explain a new system of language, based on the supposition that all languages were one and the same. He explained the meaning of two words—banski and vanski—the former referring to organic esmology, the latter to inorganic esmology or biology. There were eight divisions of biology according to the eight vowel sounds. He also took the ground that every tone of the human voice corresponded to a tissue of the body. As he closed his remarks, he said: "I hope the time will come when not a dog will wag his tail against God's elect truth."

Dr. FRIEDRICHS asked the essayist how it was possible for every tone of the voice to correspond to a tissue of the body. It was against all recognized authorities on the subject.

Dr. ATKINSON replied that second-hand cheese was sometimes moldy and sometimes maggoty.

Dr. FRIEDRICHS replied, universal language could only be found in music.

Dr. GEORGE WATT moved that the paper be referred to a committee of three for consideration.

Dr. REHWINKEL wanted to know how long life is, to waste it on such a subject. What was the use of dentists trying to build up a new language? Year after year Dr. Atkinson had tried to tear down all languages, but nobody understood him. The Doctor might call him a blockhead, or anything else, but he would acknowledge that he had not understood one word of what he said.

Dr. WATT explained his motion. He had always been a great friend of Dr. Atkinson. Still the Doctor's subject had been purely philological; it had not been on dental nomenclature. The Society for the last four years had not been benefited by the discussion. And now came a continuation of the subject with the same animus. There was not an original thought in the paper. The thoughts were the vaporings of Stephen Pearl Andrews. Hence, he had put his motion to appoint a committee in order that it might be decided whether the Society records should still be burdened with such useless matter. He did not care what the committee would do, whether they decided to send the essay to the Patagonians, or whether they bound it in morocco or calf—calf would be better—or contributed it for the enlightenment of the people, so long as they disposed of it. Perhaps it would be better to send the paper back to its origi-

nal author. However, under no circumstances could he be tortured into any feelings of disrespect against Dr. Atkinson. He was a great man, but the subject matter was entirely irrelevant to the object of the meeting. Should it be decided to put the paper on record, he would be pleased to learn every word of it by heart.

Drs. Robinson and Hunter took different sides, and sympathized with the essayist.

Dr. Barrett regretted that such unpleasant discussions should occur, and moved that the whole subject be dropped.

It was finally decided to refer the whole subject to a committee of five—Drs. Keely, Friedrichs, Odell, Rehwinkel and Peirce—to be reported on the following morning.

Dr. Crouse remarked that Dr. Atkinson had not been treated fairly. It was improper to make fun at the expense of his report.

Dr. Watt said that Dr. Atkinson was building a man of straw, and he trying to demolish it. The committee would still be under the control of the Association.

Dr. Atkinson said he had been the only chairman of all the sections called who had come prepared. He had been honest, and, as far as ability was concerned, he offered to cope with the best of them. He was a believer in immediate inspiration.

Dr. Rehwinkel asked the question: "Through what mediums did you get your inspiration? Was it an angel on a white cloud or on a dark cloud?"

SECOND DAY—WEDNESDAY, AUGUST 2, 1882.

Morning Session.

The session opened at 10 o'clock, at the Highland House. Dr. H. A. Smith, President of the Association, occupied the chair, and Dr. Geo. W. Cushing acted as secretary. The following additional delegates were reported:

D. J. Pollock, Illinois State Dental Association; Jos. Bauer, New Orleans Odontological Society; G. F. Nevins, J. E. Cravens, John R. Clayton, John B. Morrison, Graham A. Wells, Indiana State Dental Association; E. C. Moore, Michigan State Dental Association; R. C. Morgan, Wm. H. Goddard, C. E. Canine, A. Wilks Smith, W. M. Garnett, Kentucky State Dental Association; S. A. Garber, J. P. Wilson, L. C. Ingersoll, Iowa State Dental Association; H. W. Morgan, R. R. Freeman, Tennessee Dental Association.

On motion of Wm. H. Goddard, it was

Resolved, That from and after this date, the treasurer of this Association be required to give such bonds as the executive committee (of the second division) may deem to be necessary for the faithful discharge of the duties devolving upon his office, and his predecessor shall not surrender the funds, books or papers until he is informed by said committee that such bonds have been executed.

The privileges of the floor were accorded to Prof. Stubblefield, of Nashville, Tenn., and Prof. Chas. Mayr, of Springfield, Mass. Prof. Stubblefield was not present at that time.

Prof. MAYR thanks the Association for the honor. When he first commenced to study chemistry, as applied to dentistry and dental physiology, he heard much of lime-salts being dissolved in caries, etc., but a short time ago he made most careful experiments, and found that they were not dissolved. This little fact shows the necessity of careful chemists furnishing reliable bases to dentists who do not and can not have time to make difficult, delicate and time-absorbing chemical experiments.

SECTION IV. Operative Dentistry is called.

Dr. W. N. MORRISON :* During the whole course of his professional life, he had only made one mistake in regulating teeth. In that case, the patient never developed to normal size ; small in stature, diminutive in physique, with large, good teeth in a small mouth, he was free to admit that she would look a little better with that part of her anatomy less prominent. But look at the thousands of cases to the other extreme ! The public were clamorous for deformed mouths ! The first demand was to have all teeth extracted, and have all artificial, little, narrow, white teeth ; second choice, about the half of their teeth extracted, to improve their appearance and keep them from decaying ; and, thirdly, to have the crowns of the remaining teeth horribly mutilated by filing and grinding. And it was a disgrace to the profession that there were so many claiming to be progressive dentists, who yielded to the demand and practiced their requirements. A few months ago the public and a few silly snobs through the press went into ecstacies over Patti's small mouth and beautiful teeth, while in reality it was a deformity—teeth irregular, one canine so much out of the arch that when she cast a bewitching smile, her lip sometimes caught upon it, and it was with some difficulty that she could get it down. Her profile had that sorrowful, dinged-in appearance, so common at this time. Several years ago the papers had given an account

*We are partly indebted to the Cincinnati Gazette for the extracts of this paper. We suspect Dr. E. G. Betty, of Cincinnati, as the author of these excellent extracts.

of the selection of a characteristic American female head, by the designer of the new silver dollar, that should accurately represent the correct type of American beauty. He did not know the lady, nor her dentist, nor did he have any information in regard to the condition of her teeth or articulation, but, seeing her face upon the few dollars which had passed through his hands, he would venture the assertion that her mouth did not contain thirty-two normally-formed teeth. In treatment of cases, the great difficulty was to control the patients and parents. Teeth were easily moved if the force be applied in the right direction, but they as easily returned to their old places. He, therefore, had decided objections to all of the complicated apparatus, and these were obviated by his system of regulating with screws and levers and rubber ligatures, which were secured to the teeth by thin annular bands or ligatures of platinum, cemented to the teeth with oxophosphate of zinc, where they remained until the operation was entirely completed.

Dr. W. H. Atkinson: I am sorry to see a disposition of members to form an admiration society; but, with very few exceptions, I never have heard a paper of that length containing so much valuable information. That the screw should ever be used in moving a tooth I do not acknowledge; I rather controvert that; but it is true that the force must be in that direction in which we wish to move a tooth. A very slight force, continually kept up, is sufficient to perform the work in a short time, which otherwise it would require a year to do. I found that the idea of touching a tooth when it is tender is so uncomfortable to me that I wish to express myself about it. If you move the tooth slowly, say by $\frac{1}{200}$ of an inch every time, it is the same as taking a candle and tapping your shin with little blows until it gets sore. If you hit once with force you will not be hurt much by the candle, but these repeated blows will make themselves felt. The same is good in moving teeth; to move them comfortably, they ought to do in months what they used to do in years. In the vast majority of instances where the teeth are in occlusion, you need no silk ligatures, and you will be free from the opprobrium of severing the gums. The prime influence is to get control of your subject, but not to get a Satanic influence. (He shows specimens of plates. The plates have rubber rings attached to a ring of platina and iridium wire. The case shown was regulated in thirteen days. The patient had got advice to have the occluding teeth extracted)—"never worse advice came from the bottom of the pit!" Do not think that I recommend these

things because I am an old man and foggy; I am the least foggy of the lot! and I wish you to have the truth.

Dr. C. N. PEIRCE: With all deference for Dr. Atkinson, these appliances may do for some teeth, but you cannot use the same plate or form of pressure for all mouths. I do my share of regulating, and know that the application of a plate varies with the patient.

Dr. SHEPARD: I would like to ask Dr. Atkinson one question. He said that the plate remained in the mouth till two or three weeks ago; hence, according to his statements, about six weeks. How many times was that plate taken out and removed for cleansing?

Dr. ATKINSON: Never once.

Dr. SHEPARD: Were the elastics always the same?

Dr. ATKINSON: The same; except one broke where a loop was drawn and tied tightly to increase the tension.

Dr. SHEPARD:* I wish to make one remark. Any appliance for regulating teeth which cannot be removed and cleansed is not a skillfully made appliance. It seems to me that cleanliness, in the matter of regulating, is one of the most important points which we should keep in view. Plates can be made which will accomplish this very thing, which can be removed by the patient after each meal and cleaned by the patient and put back. I have plenty of these appliances which I should like to show, but I wish to state that in the great book of Kingsley, on Oral Deformities, in two hundred pages, about three lines in all are devoted to the idea that cleanliness is essential. The use of appliances for two months, without cleansing, seems very dangerous for the health of the soft tissue as well as for the teeth.

Dr. ATKINSON: All I have to say in reply is, that I will pit my patients against any for cleanliness of their mouths.

Dr. MCKELLOPS (showing a plate):* This thing alone is worth to me thousands of dollars, and I think this box represents the manner of regulating the teeth in the simplest form. My little boy, of twelve years, had one made in London, by Dr. E. Coffin. The lateral incisor was inside the arch. He went on ship-board, and took it out and put it back again, and when he came here the tooth was regulated; the child did it all himself. I saw the records of 2,500 cases regulated by Dr. Coffin, of London—split-plates—at the time he was making the plate for my son. I saw nine cases at the office. These cases were exhibited before the profession at London. The whole arrangement is very simple; thin piano-wire

*Essentially verbatim.

is the chief factor in exerting the pressure. First, an accurate impression of the mouth is taken with gutta-percha; the gutta-percha is heated in hot water and then chilled superficially by a short immersion in cold water; the impression is taken, and the plate hardened by immersing it long enough in cold water; the ends of the steel wire are made flat and tinned. After the plate is vulcanized with the spring, and fits to the mouth, take a little saw and saw the plate in two (of course leaving the V-shaped spring entire). Then I put it into the mouth and let the patient wear it a couple of hours. After this, you open the spring a little, and any child can wear the plate with perfect ease and comfort. You will be astonished to see with what rapidity you can do it. You may use any amount of ligatures, but the whole success is in the manner—in the relief it gives to the parents. It is bad if they see the child tortured. These plates can be kept perfectly clean. I was told by Mr. Shepard that they used these plates at Boston ten years ago. If they did know it, they kept it under a bushel. I wish further to state the case of a lady in St. Louis. The right lateral incisor was turned so that its face touched the posterior side of the front teeth; the teeth were crowded. I stated the case to the lady, that it would be necessary to regulate the tooth; the teeth were yellow, hard, firm teeth—very strong for a woman. I concluded it would be better to take the tooth out, and thus I stated to the brother; but they would not consent, and so they put her to a dentist near by to regulate the case. After some time, the two second bicuspids were extracted; he went on; then the next two; a short time afterwards the two front teeth were gone; it was all from the pressure of the plate. (Showing a regulating apparatus.) This apparatus is from Dr. Patrick, of Illinois—a gold and platinum bar, reaching round all the upper teeth. This bar is fastened to the bicuspids or molars by platinum bands. You may slip the regulating clasps over the whole bar, and thus move any tooth you like. These are made for the benefit of the profession, and sent as a present to our distinguished secretary (G. W. Cushing) by Dr. Patrick.

Dr. Noel:* Dr. C. O. Taft, of this city, is making vulcanized rubber plates to cover the molars and bicuspids, so that in shutting of the lower jaw it would drive the plate up. Then he called attention to cutting slots in the plate, and putting blocks of wood into it; the swelling of the wood carries a tooth rapidly forward; this can be removed rapidly. A few days ago I had a case where the bicuspids

*Extract.

were just erupted, and the molars so short that I could not make a plate firm enough. I could not use the blocks of wood any further, so I made a block of rubber, a little larger than the wooden blocks, and clasped it by a silk ligature through the rubber, tying it so as to act on the teeth I wished to move. I have the model of a young man, of twenty-five years, before and after treatment; he was transformed into a good looking man from an ugly patient with a gorilla expression.

Dr. McKellops: I never met with more hospitable men than the English dentists. They treated us with everything they could do from the time we got into port; they opened us their houses from cellar to garret. Such men as Turner, Roberts, Tomes, and a host of others too numerous to name, opened to us their houses. You had hardly time to attend the meetings. They studied from night till morning.

Dr. Shepard:* I rise to give indorsement to Dr. Coffin's method. Ten years ago Dr. Clapp, now of Boston, was for six months in the employ of Dr. Coffin, and he brought back the plates; during the past ten years they have been used in Boston. Two years ago last May, at the meeting of the leading society at Dr. Kingsley's office, at New York, I exhibited, with other things, Dr. Coffin's split-plates, and I have used them extensively, but never so that I thoroughly appreciated their value or great variety. In London we had opportunities to see hundreds of cases at the office of Dr. Coffin. The articles of Dr. Walt. Coffin have been published extensively in Great Britain and this country. The credit belongs to Dr. Coffin. J. D. White had a plate which is illustrated in Kingsley's Oral Deformities, but of so different construction and so different in application that it is hardly an invention in the same direction. I have the habit of dipping the springs in tin, and to make the tin adhere, I dip it previously in a solution of chloride of zinc. But it is not necessary; the oxydization in the mouth is not very great—in some mouths, more; in others, less. The wire becomes blackened on the surface with shining scales, but remains smooth.

Dr. Field:* I have not supposed to find a paper of that interest, and I have been paid for my presence. I had heard of the Coffin plate, but never saw it before. It will prove a matter of great importance and usefulness to the profession, and it will be a lesson to the brethren at Boston, when they have something, not to keep it for themselves.

Dr. E. T. Darby:* In capping molars it is very necessary to pay attention to the fact that if we cap one the others will elongate, and

*Essentially verbatim.

you will have a lack of fit in the jaw. I demonstrated this to my own satisfaction. When I found in a little patient the lower teeth crowded in the gums, it occurred to me that by elongating the teeth I might remedy that. I made a suitable capping one-sixteenth of an inch, and let the patient wear it for six months. The molar teeth had elongated one-eighth of an inch. I made another cap plate one-eighth of an inch more, and let it wear another six months; the molars and bicuspids had elongated one-fourth of an inch. Then I commenced to draw the inferior teeth backwards; this could not have been done because the occlusion was on the palatal surface. You must cap everything. If you ask how I hold the teeth after they are crowded out, I shall tell you that I use rubber or celluloid. I let the capping run over the molars and leave a little opening for the chewing surface; then I make a little band on the labial surface, and this will hold the teeth in very firm position.

Dr. C. R. Butler:* All the theory that Farrar gives, and which is now going through the journals with many illustrations, is very nice on the paper, but practically it is good for nothing only in very limited sense. I have had considerable experience in work of that kind, but I find that one set of appliances will meet some cases, but will not do for others. Dr. Atkinson has a form of plates that can be applied in many cases, but you have no cast-iron molds to make cases perfect; but the process of Dr. Coffin, I conceive, will cover more ground than any other method presented to the profession. It is the least expensive, but no bungler, I care not how nice he may work, can do it successfully; it requires skill. It seems to me a very important item that the plate can be removed by the patient and the mouth cleansed. Another good point of this method seems to me that you have points of leverage. One of the most difficult things is to hold the teeth so that they become fixed after they have been moved; hence, the point described by Dr. Darby seems to me quite essential.

Dr. Dorrance: I would warn against using too large wire. Small steel wire will accomplish a great deal; but with large wire the result is accomplished with injury to the tooth. That might be avoided. The same caution is to be observed in the springs; small wire is better than large.

Dr. McKellops: It is not supposed that the patient himself does the regulating in split-plates. The patient wears them some time before they are opened, then the operator opens slowly.

*Extract.

Dr. G. W. Keeley :* Some twenty years ago a girl of nine years of age presented herself to me with the centrals erupted and inside the lower ones. The first time I made a plate covering the temporary molars, with a band in front, making two little ligatures over the refractory incisors and attaching it to the rubber. This plate was put in at four o'clock in the afternoon. After supper the girl called again; I put in soft rubber ligatures; next morning she came again; I removed the plate and the work was done. I put the plate in again and tied the teeth with number 40 cotton, with the instruction to wear the plate all day and night. To-day I would simply use a plate covering the teeth moved, with a slot, and insert a piece of sea-tangle. Dr. Morrison does not say he recommends extraction of the six year molar. So do I; but if the first molars are extracted prior to the eruption of the second molar, these generally come forward so nicely without tipping that it is impossible to tell they are not the first.

Dr. Peirce : I find that economy in time and simplicity in an appliance are very desirable. Suppose we have a case of a superior lateral incisor on one side, or on both sides, encroaching on the palatine surface, or all four of the superior incisors encroaching and striking within the lower teeth. Often I have moved them, starting with the lateral incisor on the left side, drilling a small hole at the palatine surface, and in the six year molar I drill a small hole; I insert thick platinised wire in the lateral and molar. It is out of the way of the tongue because it corresponds to the form of the tongue. These small openings are readily filled and will not decay easily. I always keep on hand bars of platinised gold plate, about No. 24. I have often made the same appliance on both laterals at the same time, and placed them across each other. The leverage is sufficient to press a lateral out without changing the position of the molar.

Dr. Crouse : A case of malformation. I made the contract that if I would not make it good, I would not charge a cent. I do not do so generally, but the father was a sharp business man who had paid much for nothing. He had to pay more for making the bargain beforehand. I would advise if a patient can pay, let him pay, because I think the operator is more responsible than any other man. In many cases the teeth are destroyed because they cannot be cleaned, and every regulating apparatus can be made so that they can be taken out and cleaned. Here I had to move the upper teeth about one and one-half inches. The upper arch was very narrow; the young man was

*Extract.

large every way, but for the small arch. I did it with rubber plate and jack-screws, but I had to apply two jack-screws; he would break them by the force required. It was a year before I finished the case. The old man did the work and I did the advising. I can regulate better when I get pay.

Dr. G. B. Marklein: The method of the split-plate seems to me a very efficient means for expansion of the arch. I would like to ask some if it is applicable in drawing teeth backwards. It has always been to me a matter of slow work—retraction by silk ligatures.

Dr. McKellops: The plates answer the same purpose; springs clasping around at the outside may be imbedded and suitably bent.

Dr. Marklein: I have the case of a young lady with the upper teeth all projecting one inch over the lower, giving her a very strange expression; the second molars are sound and in place. I would like to ask what appliance would answer best to draw back these teeth so as to get them in their regular place. The only anchorage in this case are the superior second molars; the other teeth must all be drawn back, and I would like to know if the support of the two teeth is sufficient to make the appliance; I am afraid that the molars will come forward while the others go back. Ten teeth have to be moved, and only two to anchor.

It was suggested by several members that this might be done by first moving the bicuspids back and thus one by one moving the rest.

Dr. Morrison: It was 1865 that the Coffin plate was brought from Europe.

Adjourned till two o'clock.

Afternoon Session.

This session opened at two o'clock.

The committee on resolutions in reference to the death of Dr. D. C. Hawxhurst, reported a resolution relative to the loss caused by his death. The paper was ordered spread upon the minutes.

Section 5, on Histology and Microscopy, Dr. Black, chairman, had no report.

Section 6, on Therapeutics, had two papers, by Drs. Rawls and H. B. Harlan.

Dr. A. O. Rawls:* I believe and have believed that we were too enthusiastic, too certain on many things which have been held up to

*Reported in extract.

us as dentists. My subject is *Pulpless Teeth*. Two tissues are more or less intact in pulpless teeth and devoid of life—enamel and dentine; one tissue still existing with possibility of a slight nutrition, the other with the probability of numerous breaks in the channels in the cementum. In cases of alveolar abscess both are usually involved, but exceptionally this does not take place. Aside from this, an alveolar abscess may involve more or less of the periosteum. I believe it is generally acknowledged that there is but one periostal membrane between process and cementum, and that this is attached by prolongations and ramifications of connective tissue. This being true, an inflammatory process may result in abscess which may destroy the connection between the process and membrane, or cementum and membrane. . . A dead pulp presents at some period the condition of a dentulous cyst. . . . Success in the eye of the practitioner is not always success in the eye of the histologist. The demand may be the longest time during which teeth may last in the mouth or be of service to the patient without detriment to the soft tissue. Both imply different degrees of success. It is common that dentists speak of a cure of abscesses as perfect, as if it was in external tissue. This could be only by quick restoration of the lost periosteum; for when false tissue is formed, this not being normally nutrified, will finally break down. . . . Dead animal substance, like dentine, cannot remain in contact with living tissue without affecting living tissue in a greater or lesser degree. . . . Are we not presuming too much of this vis vitalis and recognizing too little the chemico-physical possibilities in our treatment of these cases?

Dr. H. W. Harlan:* When the treatment of alveolar abscess was up for discussion at the International Congress, Mr. Walt. Coffin recommended hydrogen-dioxide as efficacious in cases where no fistulous opening was established, mentioning that the cavity could be evacuated without coagulation. After some ten months' constant use, I am induced to indorse it. A few points on its preparation: H_2O_2 is the formula. It is not always possible to obtain it sufficiently strong for use. To prepare it in small portions, dioxide of barium is added to a solution of one part of sulphuric acid and five parts of distilled water, taking care that the temperature does not rise above 60° F., and this operation is suspended when the liquid has become only slightly acid. The precipitated sulphate of baryta ($S\ O_4Ba$) is deposited and the liquid decanted off. It is better to use an excess of sulphuric

*Almost verbatim.

acid. This solution will scarcely ever contain over five per cent. It may be concentrated in the vacuum below 68° F. over sulphuric acid, or by freezing and removing the residual liquid, which is much more concentrated. If the solution be allowed to evaporate over sulphuric acid, it may happen that oxygen is given off. In this case, a few drops of sulphuric acid will prevent further decomposition. The aqueous solution can be kept for months in a dark place. It is easily soluble in ether; this solution is more stable than the aqueous solution, and can be distilled. To determine the quantity, it is only necessary to acidulate the liquid and to drop into it from a burette a solution of potassium permanganate of known strength. In this case, the reaction $2(KMnO_4) + 3H_2SO_4 + H_2O_2 = K_2SO_4 + 2MnSO_4 + 4H_2O + 3O_2$ takes place. Each gram of potassium permanganate corresponds to $\frac{108}{2000}$ of H_2O_2. During the last years, when it commenced to be used more, extraordinary effects were attributed to it. It has been stated that no physician who has applied it in spray in suppuration will ever want to be without it. A spray of two per cent. will render offensively smelling air inodorous; nine parts of urine with one part of dioxide mixed and allowed to stand for nine months did not putrify. Behant (?) and Paul de Bert have found, by a series of experiments, that fermentation caused by living animals is arrested by it, but not that caused by nitrogeneous compounds. It is occasionally stated that the commercial article contains "ten volumes of H_2O_2." This is due to the vagueness which is attached to the meaning: ten volumes. H_2O_2 is a liquid, and ten volumes means that ten volumes of oxygen can be produced from it, which corresponds to a three per cent. solution. Most of the hydrogen-dioxide in the market is a solution of common barium-peroxide in hydrochloric acid. Bronsdorf's product contains three per cent. It must be preserved in small dark bottles. I use this aqueous solution and inject it into the sac of the abscess. A rapid evolution of oxygen followed, and evacuation of the contents. One may see the frothy contents escape if the proper amount is used. It has such an affinity for the contents of the sac that it must commend itself to any one for the task of removing the pus from the apex. I wash first the canal from whence the pus is oozing and then I inject the remedy; then I introduce threads of cotton and seal the cavity. The dressing stays there three days; if there is no more odor, I pack it tight or fill a weak root. In some cases it may be necessary to use the hydrogen-dioxide three or four times in intervals of three or four days. It is always necessary to adjust the rubber

dam in changing the dressing. I prefer the volatile eucalyptol as an escharotic. I venture to suggest that hydrogen-dioxide may become useful as a bleaching agent for pulpless teeth. It is used in arts already extensively.

Prof. CHAS. MAYR: I am very glad to see an agreement of opinions. A couple of years ago I recommended, at the meeting of the Connecticut Valley Dental Association, hydrogen-dioxide as perhaps useful for bleaching teeth. We talked about it, but we had considerable difficulty when we discussed the way how to do it; to include it into the pulp chamber and to seal it up could not be done because the pressure of the oxygen soon would burst the tooth—from the outside it would only act by endosmosis, and very slowly. The question of bleaching teeth cannot be solved before we know what colors them. Not long ago a man asked me to bleach feldspar, as if it was something like bleaching a calico dress; I had to examine what the coloring matter was, and then only I could proceed. Thus, before we know exactly what colors teeth, we cannot bleach successfully; the coloring matter has been supposed to be every kind of things, but to me there is little doubt that it is a modification of haimatine. We need not suppose blood corpuscles to enter the pulp: the serum contains all the elements for haimatine. As often as I hear somebody using the term vis vitæ or vital force, I always am greedy for information; I always wish to know what is meant by it, and I never found any man who would or could give me any sensible answer. It is a vague nothing, an empty word, as far as I have learned thus far; I would like to ask Dr. Rawls what he means by vis vitæ.

Dr. RAWLS: I do not believe in a vis vitæ, as it is plain from what I said.

Dr. INGERSOLL:* I have offered to the profession a series of papers on Alveolar Abscesses and Alveolar Ulceration, and Sanguinary Calculus. I presume that no pulp ever dies without causing disease in the peridental tissue; that is a universal rule. There may be exceptions. The form of disease is various; it may be true alveolar abscesses, it may be chronic inflammation of the membrane, it may be permanent induration of the parts surrounding, it may be ulceration. We often hear in the profession of ulcerated teeth, that is, of teeth having abscesses, and very little distinction is made between ulceration and abscesses. I had a case in which a filling had caused what I had been in the habit of calling alveolar abscesses, but I found no pus-

*Nearly verbatim.

cavity, no openings; I found, one-fourth of an inch from the apex, hard incrustations, unlike salivary calculus, very dark, very hard, much harder than that, but granular in its nature. The thought first occurred to me: Where on earth could salivary calculus ever reach this point, so as to deposit there lime-salts? The gums enclosed almost entirely the neck of the tooth. It could never have got there except by injection. Where did it come from? What were the conditions of its formation; what its source? I did not analyze it, but I am certain that we should not find particles of food and epithelial cells, but we would find something—the dark coloring matter. This is not in ordinary calculus in connection with alveolar abscesses, but in that connected with ulceration. I have sufficiently demonstated to myself that it comes from the blood; therefore, I call it sanguinary calculus. We have in the blood all the material needed for this calculus. This nomenclature is derived in analogy with salivary, biliary, urinary calculus. At the neck of the tooth sanguinary and salivary calculus may touch each other; at the apex they form a distinct line of demarcation. In another case, a short time ago, there was not the slightest amount of salivary calculus, but, one-eighth of an inch below the margin of the gum, a black line of tartar; it came from an ulceration.

Dr. PEIRCE: In alveolar abscess do we not always find the alveolar process more or less broken down?

Dr. INGERSOLL: It has occurred to me that it might be possible that the lime-salts may be derived from the broken-down tissue, but I have seen cases sufficient to warrant me to say that this is not the chief source of the lime-salts.

Dr. PEIRCE: I confirm the statement of Dr. Ingersoll, that the deposit is from the blood and not from the saliva. I have seen cases where there has been no possible connection between saliva and the secretion at the root.

Dr. MORGAN: Have you not found the usual symptoms of Rigg's disease in those cases?

Dr. INGERSOLL: Yes.

Dr. RAWLS:* There may be two ways by which an inflammation can take place within the socket which teeth occupy—from within or from without. The external cause must be a cause that will work from the outside to the inside; the internal cause must be a cause that cuts off all the nutrient circulation, that is based upon want of integrity of the tissue, as results from systemic conditions that favor the

*Nearly verbatim.

least sign of disturbance. It is known where these deposits are found; only at the surface of tissue that are not intact, the surface must be exposed by inflammatory action, or no deposit is made. The valves of the heart and the parenchym of the liver do not have deposits on the inside, but upon the external surfaces, which are made apt by the inflammatory process. I apprehend that Dr. Ingersoll will find that, where he sees sanguinary calculus, and feels sure that it comes from the blood, that there is no entrance to the spot from above, or there may be a small opening. The different degrees of hardness or color are no reason to consider it different from salivary calculus. It is the result of physical action of the tissue, infiltrated or pressed in between the teeth, and I apprehend that this is not one of the results of Rigg's disease. Tissue that is broken down or under a condition to break down, cannot stand in contact with normal pabulum, because of the want of integrity, and not because of any special irritating influence that it will exert locally. The supply of nutrition will be cut short and never reinstated, because, on the one hand, the diseased tissue is not in proper union with the normal tissue; it is disorganized organic material; on the other hand, there is no affinity between the substances that are healthy and those diseased ones with which they are in contact. The local forces at work to destroy this, destroy it with the least possible force; consequently, there can be no possible reunion. We are in the habit of teaching the student and our patients that it is possible to save teeth in such a condition, that there is no probability of it without violating the laws of nature, of physics, of the chemico-physics, of the arrangements which govern our body. We are teaching our patients that we can cause healthy tissue to develop and grow out of the dead substance, the parts of which are not kept in circulation. I would like to ask Drs. Atkinson, Watt, and Prof. Morgan, to bring the thing up whether they agree that there is something in the body that is not material, something not material in the world that surrounds us. I want to know it, if they know anything of a vital force, a superhuman force, that will cause a cure or return to health where there are no physical causes, where there is not a solitary reason, by analogy or otherwise, that such a thing could take place. I want to know whether any man believes in angels or in material substance-contact. I want to know whether the processes discussed to-day are caused by spiritual things, like angels, or by the contact of material substances.

Dr. Watt: I do not know what my young brother has been talk-

ing for the last ten minutes. I am glad he did not hear the remark; it is not important, but I had to try my wind, to see if I had any voice. This question of sanguinary calculus is not very mysterious. We have been stumbling over it just as my friends in West Virginia were stumbling over a valuable mineral. A returned congressman remarked to me that there was nothing good in that reddish crust; it was a nuisance. I said: no, not much; they make shells, guns, locomotives and railroads out of it. "Why you are not talking about that nasty stone?" "Well," I says, "you have been blundering, that is the most valuable iron-ore known, the most profitable in this mountain region." Dr. Ingersoll only gave a name to this sanguinary calculus, but it is an old thing; it is found in all parts of the system. I saw one weighing thirteen ounces imbedded between the abdominal muscles; it was reddish in color, the patient believed it to be a cancer, but it was removed without much difficulty. Dr. Watt believes ammonia to cause the precipitation of dissolved lime-salts in sanguinary and salivary calculus. "You will smell the breath of patients loaded with ammonia." He thinks the ammonia derived from the breaking-down tissues. In breathing through the mouth, the saliva becomes charged with the ammonia.

Dr. INGERSOLL* remarked that the source from which calculus is derived can be traced to the blood. Even all salivary calculus is in the blood before it gets in the saliva.

Dr. BUCKINGHAM* believed in the vis vitæ as the mysterious power emanating from God. For bleaching the teeth he suggested a recipe by Dr. Kirk—sulphite of soda with borax.

Dr. ATKINSON* was sorry that as a body they were getting as crazy and as "Atkinsonian" as himself. They were all troubled by an ignorance of the laws of terminology. What was ulceration but the breaking open of an abscess? What was suppuration but an inflammation, and inflammation an oxydation? Dr. Watt takes things in masses, but we must take them in molecules. He blessed the Lord that the ladies wore their hair long, because they retained all their inspiration. He believed in the vis vitæ, and that all power came from God.

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*Short extracts.

THIRD DAY—THURSDAY, AUGUST 3, 1882.

Morning Session.

This session opened at the Highland House at 9.30.

The following additional delegates were reported to the convention: W. O. Kulp, Davenport, Ia.; W. Hart Cameron, Cincinnati; T. W. Brophy, Chicago, Ill.

A paper from Section 6, on Pathology, Therapeutics and Materia Medica was read by Dr. F. M. Odell:*

Dr. Odell closed:†

It is very well, nay, sometimes imperative, to adapt the treatment to the medication of the prominent symptoms; but in order to radically cure a disease the diathesis must be determined. It is true that in many diseases, like hay-fever, the insult of one organ may be from the tintillating by the pollen of certain plants; but this cause removed, any new accession of dust to the room may serve to perpetuate the impression for days and weeks, until it becomes a cachexia. For the early treatment, we may have drugs; but for a cure, a treatment of the diathesis must be effected. Salicilates will do in one case; in scrofula, some form of mercury would be good, while salicilates would be wasted. I have little faith that salicilate of soda will reduce the temperature, but this is obtained by a combination of salicitate and quinine. A treatment which will reduce the fever from one cause is good to reduce the fever from others. I recommend the use of water, inside and outside, from warm to hot. In hay-fever, the itching sensation may be combatted with hot baths and borax, and the perspiration is obtained by hot water or tea; the temperature is reduced by wearing underwear with large meshes, a contrivance which may assist in keeping the heat in winter and reducing it in summer.

Dr. Atkinson:‡ We are in what the paper calls molecular metamorphosis, a subject that is known by very few, if any. I have been delighted with the paper; it indicates research, and holds to the mode of motion that we call function. When we deal with remedies, we must remember that remedies must contain affinities for the molecular structure, and to get them in the simplest way we must get them by way of feeding. Every act of health or disease depends upon these hidden movements, and the main trouble here, as in other places, is in regard to what is meant by the terms physiology and pa-

*Unfortunately the short-hand manuscript lacked one page, and we could not find it; somewhere it had got between very many pages of other material.

† Nearly verbatim.

‡ Essentially verbatim.

thology. . . . . *Physiology and pathology are identical;* pathology is only abnormal physiology. If we were resolved into a mere little corporation, giving and asking questions, we would be able to arrive at something that would be a basis, that might be ultimately accepted by this body, that will ultimately give us the alphabet of these functions, so that the ladies can understand it.

Dr. Friedrichs: Do I understand Dr. Atkinson to say that remedies, when being administered, must have molecular affinity?

Dr. Atkinson: Certainly.

Dr. Friedrichs: There is many a man who actually does know the manner in which medicines act when he administers them; he knows it only by empirical knowledge, from mere observation; but there is no one who knows how it is done or how these results are obtained. I know it is conceded, as far as influence of medicines is concerned, that we are considerably in the dark as to their action, and I can hardly take it for granted that there is molecular affinity in medicines to cure diseases. It seems to me we do not understand each other.

Dr. Atkinson: When I speak of giving medicines with the food, I mean that the individuals have to be fed upon a substance that must have passed into the condition of dead; but must only have died, and not be effete; hence, must have energy capable of being used. Food may be poison or medicine, by reason of the dissatisfaction of the typal proportion of energy in the tissue that is to be fed or cured, and depend finally on the laws of affinity residing in the atoms. Take the formula H_2O; what do we mean by putting the figure 2. We mean measures of affinities, and in an electric current we get two gases that were combined in H_2O; it is by reason of such affinities that medicines do act.

Dr. Friedrichs: The mere assertion of H_2O proves nothing; the main things ought to be the facts under discussion.

Dr. Buckingham:* Of matter, as such, we know nothing except its properties. Matter is inert; it only becomes something by the effects it produces. Property is in the atoms; the strongest poison contains the same atoms as food, when these atoms are combined in certain proportion.

Dr. Watt:† These statements of Prof. Buckingham are very lame, and so you will not be surprised to see mine more lame still. Such statements are too general, that we do not know how medicines

*Difficult to hear, extract. †Verbatim.

act, or that we do not know anything about them. Medicine is not a unitary; it is a wonderful complex idea, and we do understand how some act, but do not understand how others act. I know some of you, and it would not do to say, because I do not know all: Dr. Watt is not acquainted with the members. It would not do to assume that medicine is medicine; it is made up of a great variety of individual materials. Take, as a familiar illustration, the treatment of malarial diseases by the use of arsenious acid. It is in medicine as in agriculture, we want to destroy the weed without destroying the useful herbs. In the diseased organism, there is tissue built up under the influence of the ague; it is broken down; it is not as thoroughly alive as healthy tissue; therefore, if we introduce the poison—the arsenical poison—we introduce it just as we put it into our stables to kill the rats; the arsenic kills the morbid tissue because the latter has a lower vitality. The medicine may be so strong as to kill the healthy tissue, too. The emunctories carry out the dead matter; we stink when they come out, but that is the better for us. We stink in order to smell perfumed. Take another example: anaemic girls; they are bloodless, and there may be some reason why they lack red corpuscles; that has to be improved. It has been found out that iron forms an important constituent of the red corpuscles. It is better to furnish the iron in the most assimilable form. If we administer food that contains iron as a part of its constituents, it is easily assimilated; also iron precipitated by hydrogen is very good; it is very finely divided. Some say iron cannot be assimilated, but I know that: If you take the metallic iron and sprinkle it on the bread and butter of an anaemic girl, the red corpuscles form much faster than in her sister, who did not take iron. I found it by experiment, and by analysis I found how it works.

Dr. Friedrichs: I believe that it is simply customary for physicians to do so. The doctor said how arsenic acts, but what is the cause of malaria?

Dr. Kulp: Dr. Watt said metallic iron. I have always contended that, in taking medicines, it is necessary for curing to give them in such a form that they are easily assimilated. What was the reason of the improvement in the case of the girl taking metallic iron? The bread and butter? Or was it because in any other form nature would have thrown away the iron?

Dr. F. W. Odell:* It struck me, after the last speaker, that he made out sufficiently that he did not know anything about the action

*Verbatim.

of medicine, at least, to a certain extent. To a certain extent, we may know the action of medicine; but when it comes to the question underlying that, we come to a point beyond which the *How* cannot be answered. Certain medicines act by assimilation; they must be assimilated to act at all, and thus far we know it; but we only know that the medicine being present, the result follows, and that is empirical. But when we come to the *How*, we have no means of trying the case. Other medicines act by their presence. Take subnitrate of bismuth as an illustration; I do not know if we may call it a medicine, but it is a sort of slattering over the surface of the intestines; we have no assimilation. Dr. Watt stated that the arsenic cured, but he does not say how. I think we can come nearer as to the action of arsenic as a medicine by tests which are within our reach. I think it acts on the nervous system; by the changes in the mode of motion in the nervous system we get a different sort of movements, which enable the system itself to come into the normal train of action. Whether arsenic can kill certain lower forms of life within the system, in the method that he has made out, is to me highly doubtful; it is possible that it may be. In my judgment, it enables the organism to work on the normal state, and thus to get rid of the irritating causes.

Dr. WATT: We know that these substances die under the influence of arsenic, and it gives the organism an opportunity to act by clearing out the debris. We do not know how the plough does pulverize the soil; we only know something about it; compared with others, we know something.

Prof. MAYR: Just about arsenic and its action, let me state a few interesting facts: In my laboratory I had two bottles, covered with vegetable scum or mould, and what do you think these two bottles contained? The one was arsenite of soda and the other was arsenious acid; on none of the other bottles was any scum. Hence, as to the power of arsenic to kill lower organism, I am exceedingly skeptic. I tried to preserve a frog by pouring over it the most concentrated solution of arsenic I had, but in short time it was covered with mould, and thoroughly alive; hence, arsenic does not kill lower organism. I consider the view of Dr. Odell, that arsenic acts by stimulating the nerves to increased activity, as far more probable.

Dr. F. W. ODELL: While we sneer at empiricism, all we know in medicine is empiricism; empiricism is at the foundation of all our knowledge.

Dr. ATKINSON :* We talk of tonics and stimulants without careful distinction, but we can define their action comprehensively. We have all functions made up of molecular movements; there is no such thing as cellular action; all is molecular movements. But there is a mental sense that must perceive the difference between change of the pabulum and imparting of energy, which operates on the mode of molecular motion, whereby it does not combine but awakens energy within it. This is a *stimulant.* Any imparting of substance that is taken into the system, combining with the molecules thereof, becomes a part of the molecules, and is a *tonic.* The tonic is food in every instance. Stimulant is the action inferred by my clear-headed pupil who spoke last. These are a few of the discriminations. We will regard with less reverence the mass of nonsense in pathological works. Every atom has a living and a dead side, that is, a dynamic and a static side. It is doubtful if we can conceive the atom in its dynamic condition; where we trace it, we find it in the sleeping state; and where it is not in sleep, it is dynamism. The power, the energy that is the immediate cause of its motion, we do not know. We do not know anything of causes, only of sequences. We must be careful about things, whether they be food, medicines, or whether they be poison; any one that can act upon the molecules can change the condition of the molecules. A poison is something that has a power to produce a minus action on the molecular movements, or to arrest them.

Dr. FRIEDRICHS : I would like to know any other authority who believes this theory.

Dr. ATKINSON : These statements are of a nature that every one can perceive what is meant.

Dr. DARBY : Some say arsenic acts by catalysis, some say it is absorbent. (Reference is made to the well-known experiments of Dr. Flagg, devitalizing ten pulps with a piece of arsenic that did not lose in weight. A short discussion follows on the well-discussed subject, without any special interest, participated in by Drs. Atkinson, Buckingham, Watt, Kulp, etc.)

Dr. CROZENS : Are we to understand that it is possible that the arsenious acid can be removed and the vitality reëstablished after the vitality has been destroyed, and we find it still at the apex, drilling through?

Dr. ALPORT :† It is very difficult for any one to explain why med-

*Extract. †Verbatim.

icines act; probably the most we can tell is, that they act. In regard to the experiments of Dr. Flagg, I wish to say one word. It seems that his ideas are not properly understood. As I understand Dr. Flagg, he wishes to demonstrate that it is not by absorption that arsenic acts, that the destruction of the vitality of the tooth was not from the absorption of material and from chemical action of the material on the material of the pulp, but that the presence of arsenic was sufficient. It acts as an irritant, and, if I remember the experiment correctly, he stated that he left the arsenic in the teeth for a week and found not the slightest trace of arsenic except at the point of contact. I read the articles with great care. The irritation caused a flow of pabulum, but prevented its return, and thus produced strangulation at the apex of the tooth; that is his reason for the destruction of the pulp; it died from the arrest of the circulation of the blood. I gave a good deal of thought to the effect of arsenic at that time. I found this: You take a pulp that is wounded, and it takes the least portion of arsenic to destroy it; you take a pulp that is not wounded, and place the arsenic thus, that the circulation does not carry it into the pulp, and it takes a greater quantity to devitalize it than before. I found also another thing; I have frequently done this: I have put a small quantity of arsenic into a tooth which it would not devitalize. I then took the piece out, and, to my surprise, found a portion of the pulp sloughing off and that portion below remaining healthy, and these teeth remained alive for years afterward. I would not recommend it as a practice, but I believe it to be a fact, and I believe also Dr. Atkinson has found the same thing, that a portion of the pulp sloughed off and the balance remained living.

A paper of Dr. Richardson being referred to the Section, could not be read on account of its length.

Dr. I. N. Crouse,* chairman of the committee appointed to draft resolutions in memory of the late Dr. M. S. Dean, of Chicago, reported a paper, which was ordered spread on the memorial page of the transactions of the Association. It states that in the sad bereavement they had lost the companionship of one who was original and progressive in thought, though calm and conservative in action, and just and charitable in expressing his convictions, possessing keen perceptions, delicate sensibilities and refined tastes; he was pure, warm-hearted and sympathetic in nature, genial, humorous, witty, and at times even boyish and exuberant in spirits. With these attributes

*From the Cincinnati Gazette.

governing his life, he enjoyed to an unusual degree the confidence and affection of his associates. They had lost a scholarly, cultivated and generous friend, who had filled with honor and great satisfaction every responsible position at their disposal. His brilliant, intellectual attainments, earnest, honest, and modest bearing, made him not less dear to their scientific friends abroad than to themselves. The heartfelt sympathies of the Association were accorded the bereaved family.

Dr. W. C. BARRETT, chairman of Section 7, on Physiology and Etiology, and in reference to a suggestion in the President's address, read: "That the sum of $200 be set apart to be adjudged by a special committee of three members to be appointed by the President of the Association, to the author of the best paper on the etiology of dental caries, the paper to be based upon strictly original investigation, and to be presented to this Association in the report of Section 7. Such committee shall prescribe the conditions upon which essays shall be presented, and in case of two or more papers of equal claim to merit, they may in their discretion divide the sum so set apart and award a portion to each essayist. Unless papers of sufficiently original merit be submitted, the committee may decline to award the prize, and hold it over until it has been fairly earned. The competitors for the prize essay need not be members of this Association, but the profession of the world is invited to the consideration of the subject.

Dr. BARRETT* also read a paper on The Origin of Nervous Force. He said, and endeavored to prove, that it was a correlation of original force—force as it is in general and in its essence. In that sense it was a continuation or a complement of original forces, such as heat, electricity, and, like these, it was derived from the molecular action of chemical affinities. He mentioned an example of his position which he had given recently at a meeting of a State Dental Association. He had exposed the inside organs of a dog—the heart had been bared to view. Soon the beating of the heart ceased, as though life were extinct. Some friends of his had retired and declared that his experiment was a failure. But he said it was not, and applied a shock of electricity, at the same time infusing the proper amount of heat. The result was that the heart began to beat as regularly as before the operation commenced. The scientific research of the day was toward the conservation of nervous force.

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*The paper was very exhaustive. The space for this number being already very much taken up, we have to reserve it for one of our next numbers.

The following are the sections assigned for the ensuing year: Artificial Dentistry, Drs. Buckingham, Funderberg, Dorrance, Harroun, J. G. Harper, W. H. Keith; Dental Education, Drs. Crouse, Pierce, Templeton, Shepard, Hart, K. B. Davis, Brophy, Alport, Morrison, W. H. Morgan, Crozens, Thomas, P. G. C. Hunt, C. M. Wright; Dental Literature and Nomenclature, Drs. T. Taft, Atkinson, Friedrichs, Rehwinkel; Operative Dentistry, Drs. Betty, Darby, Kempton, C. J. Keely, George L. Field, Kulp, French, J. P. Wilson, G. F. Nevins, I. Brown, B. G. Marklein, G. W. Smith, Cormany, Goddard, Finley, G. W. Keely, Geo. H. Wilson, Morrison, W. C. Wendell; Pathology, Therapeutics and Materia Medica, Drs. Odell, Harlan, Rawls, O. Arnold, L. C. Ingersoll; Physiology and Etiology, Drs. W. P. Horton, Barrett, E. Hunter, H. A. Smith.

Afternoon Session.*

The afternoon session began at two o'clock, with President H. A. Smith in the chair. The first order of business was the selection of a place for the next annual session. Several names were mentioned, such as Niagara Falls, Nashville, Cleveland, Pittsburg, and Atlanta, Ga. The first two were reported by the committee especially appointed for that purpose. A dentist from Pittsburg recommended that city because it had water works, erected at an expense of $7,000,000, and yet not a drop of water. After three ballotings, Niagara Falls received forty-five votes and Cleveland thirty-six, making the former the choice of the convention. Drs. Rawls and Morgan were appointed tellers.

Following are the officers of the Association elected for the ensuing year: Dr. W. H. Goddard, of Louisville, President; Dr. George J. Friedrichs, of New Orleans, First Vice-President; Dr. E. T. Darby, of Philadelphia, Pa., Second Vice-President; Dr. A. W. Harlan, of Chicago, Ill., Corresponding Secretary; Dr. George H. Cushing, of Chicago, Recording Secretary; Dr. George W. Keely, of Xenia, O., Treasurer. Executive Committee, Dr. F. M. Odell, T. T. Moore, S. G. Perry, C. N. Peirce, W. H. Morgan, F. H. Rehwinkel, Dr. J. N. Crouse, Dr. A. M. Dudley, Dr. G. H. Field.

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*From the Cincinnati Gazette.

FOURTH DAY—THURSDAY, AUGUST 4, 1882.

Morning Session.

This session opened at 9.30 o'clock.

First subject, the resolution of Section 7, to set apart $200 to be adjudged to the author of the best paper upon the Etiology of Dental Caries, etc.

After a long discussion, in which participated Drs. Atkinson, Friedrichs (the latter amending it that he will give $50 himself additionally as an inducement), and Butler in favor, Drs. Taft and Alport against, the President in favor, it was finally adopted. Voted $200.

Section I. Artificial Dentistry is called.

Dr. Buckingham :* *Celluloid* is one subject, and the *practicability* of working single teeth and not in sections, the other. Continuous gums are liable to break, heavy and difficult to make. We have celluloid which answers admirably all requirements as to resemblance. You know that the natural teeth in time are worn off, broken down and differently colored. We should be careful in selecting the proper color for the teeth. If one makes the teeth himself it is very easy: one has nothing to do but to put the proper paint on them and burn them in a muffel. Why, then, can we not, with these two materials, the one that will imitate the gums, the other the teeth, get resemblance to the natural parts? The best kind of people do not like this artificial work, but do not like to give it up. Celluloid is made in the well known manner: It is mixed with small proportion of camphor and a little oxide of zinc and colored with a little vermilion. In order to soften it, it is necessary to heat it. When you heat it to about 212° F., it slightly softens and you can bend it like a piece of wood, but it will go back; at 250°–290° it is still hard; at 290° it becomes doughy, like putty, and can be pressed in any shape. I put some blocks of celluloid in test-tubs and heated them to certain degrees of heat, putting on the top a block of metal. Up to 290° F., you do not perceive any change; at 290° they compress slightly; at 295° they settle down a little; at 300° they begin to take the form of the vessel. Each was ten minutes in the heat. Chemical change and softening are not always the same. At 310° it begins to boil at the bottom, at 320° it becomes porous. The temperature should, therefore, be between 290° and 310°. It will not weld. Two clean surfaces may cohere, but the work should be made on one piece. It is very essential to obtain even heat; glycerine, for instance, may be

*Extract.

eleven degrees hotter in the center than around the edges. (Shows a simple apparatus for heating with dry air.)

Dr. MORGAN: Supposing you make a piece and cast where there are considerable under-cuts; you can remove the celluloid by warming it, and trusting its going back afterwards again; but I make a hollow tin cast by pouring the metal in the plaster, and before it is entirely cooled I pour it out, and thus get a hard inner surface.

Dr. BUCKINGHAM:* I follow the same idea. You obtain hollow casts that can easily be removed by compressing them with a vice, or something of the kind. You all know the great importance of absorption, the importance of the mouth and face retaining its expression and that the nose-muscles have a support and do not fall in. We all know of what importance the expression of the face is, as far as beauty is concerned, and you may pay $100 for a portrait with life in it, but you can also have a portrait for $5. The whole science of the physiognomy is an important science; you know what it is when a man looks good and pleasant: he is then really pleasant. Tell your patients that while they are thinking, their thoughts will be expressed in their countenances. I find it has a very beneficial influence on most mouths.

Dr. DAVENPORT (?): I would like to ask Dr. Buckingham if the coloring matter in celluloid is the same as in red rubber, that is, vermilion, 36 per cent?

Dr. BUCKINGHAM: Red rubber has generally the following proportions: 40 rubber, 24 sulphur and 36 vermilion. Celluloid contains: 100 celluloid, 40 camphor, 2 oxide of zinc and $\frac{6}{10}$ vermilion.

Dr. DAVENPORT (?): What is black rubber? Is it more the natural rubber?

Dr. BUCKINGHAM: Rubber from the tree is like milk; natural rubber is about buff color.

Dr. MORRISON: I would like to ask Prof. Buckingham with regard to the color, if there is anything that will preserve it?

Dr. BUCKINGHAM: I have recently studied about that, but in some mouths it *will* discolor.

Dr. BROPHY: A good deal of loss of color can be avoided by using tin to line the casts. It leaves a better surface, and where you polish it leaves a good polish; that is the secret—the hardness and smoothness which does not absorb and discolor.

Dr. ATKINSON: If we substitute any portion of the lost tissue, it is

*Extract.

desirable that we substitute something conforming in conductivity. There has been a discovery by George F. Reese; it is a gold alloy, and I have a specimen here; it shows to advantage; it has been a satisfaction to me and those who have used it. It is a metal very acceptable to the tissue.

Dr. RICHARDSON (?) :* I did not know anything of Dr. Atkinson's metal. Two years ago I was on a visit to Dr. Taft and my attention was drawn to the subject of plates. I told Dr. Taft that I would lose my patients by continuing to work rubber. Finally I found a metal composed of platinum with a very small proportion of gold, made fibrous, that would adhere to plates as well as paint does to wood. This plate is one that I have worn for two years. Having done this, I found that the metal welded so well that I used it for filling teeth. (Several very fine specimens of fillings are passed.) There is no mercury in these fillings, and it does not tarnish. I have put it up in boxes, and you find it at Mr. Randolph's. As to the temperature, I can only say that if you take cold water, and wear such a plate covered with this metal, you find the same difference as you find ordinarily. I have seen a good many bad mouths, but mine was restored in four weeks after wearing that plate.

Dr. PERKINS :† I have been feeling this morning as I have not been for twenty years the degrading influence of what is going on. I am not accustomed to use strong arguments. I want to speak on this subject. I think that this Association expected transactions by the most eminent men of this country; we expected to hear new things, and to hear the opinions of men who give the very best for our benefit, and what has this been to-day? I have been taught, from the time when I entered a dental office, not to do anything that might degrade the profession; I have been taught that no man can bring mechanical appliances into the Society and speak patronizingly about them and ask us to take them. No Society, from the smallest to the American, would have done that. I find Dr. Atkinson, one of the great lights of the country, coming to advertise his metal! It is in the principle that the wrong lies. One thing in regard to celluloid: I have observed a great many men wearing it, and I find that those who use a great deal of alcoholic liquor cannot use celluloid; I have seen cases where one-half to two-thirds of the plate had been eaten away by the use of alcohol and alcoholic liquors.

(A short discussion of no material importance followed.)

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*Nearly verbatim. †Verbatim.

Dr. DORRANCE :* The heat-conducting property of the plate is very necessary. In 211 cases observed by me of partial or full upper plates, 176 were rubber ; 69 (?) per cent. showed the effect in an aggravated degree, 19 in a marked degree and nine nothing ; in three cases there was necrosis and sloughing of the tissue. My estimation of the average time of wearing was two-thirds of a year ; in many cases, there was mechanical insufficiency. My observation of 50 cases in the lower jaw shows that, while some cases were quite as marked, generally the effect was not so extensive. Of the 211 cases, above referred to, 126 have been replaced by metallic gums, and under such treatment nearly all have recovered. Now this number here under treatment may give a fair estimate of the value of the change ; in some cases resetting of the gums, and in all cases relief has followed. These observations show the necessity of conduction as far as they go, and to do justice to the patients who need artificial denture, we must provide them with such as will do them the least injury and secure the best results.

Dr. ALPORT moves that the paper of Dr. Dorrance be printed. Referred to a committee of three.

Dr. DORRANCE :† I have made an alloy composed of equal parts of copper, silver and zinc, and used that as a base for an alloy to solder gold ; I did not consider it as of great importance. I had found from experience with quite a number of students that it is quite difficult for them to get facility in making the alloy ; I made some of the alloy and I happened to find it excellent. I found that, while working excellently, it was open to improvement, and I found that the quantities were not the best proportion that could be used. During the last months I have been experimenting, and found the following : The metals must be pure, free from arsenic. The formula is : 1 part pure silver, 2 parts pure zinc, 3 parts pure copper. The silver need not be pure if you allow for the amount of copper already present, but the other metals must be pure. This solder, of which I have samples for those who have to do with solder and care for it, is very tough ; it gives an excellent flowing solder on brass, and you can make out of it any carat solder for gold ; you can make the color of the solder match the color of the gold which you solder. I have also a silver solder : 12 of silver and 1 part of the alloy, and this solder follows the color of the silver ; it can be made in very small quantities. I have also a blow pipe which I made for a number of

*Paper; short extract. †Almost verbatim.

my friends, which melts half a pound of brass on coal in something over forty seconds.

Dr. BROPHY: Which proportion of the alloy approaches nearest fine gold?

Dr. DORRANCE: I should advise 19 carat gold. The blow-pipe I referred to was made from fifteen to twenty years before Fletcher's, and is very similar in construction.

A motion is made, and strongly favored by Dr. McKellops, of tabulating the skulls in the different collections of the country, in a point of view of dental statistics, to ascertain the degree in which civilization has influenced the decay of teeth, etc. After a short discussion, the subject is dropped for this year.

AFTERNOON SESSION.

Drs. Alport and Atkinson conduct the newly elected president into the chair. President Dr. J. L. Goddard presides the meeting.

Dr. DORRANCE: Little things have helped already a good deal. Not long ago I found something which is known by platers and dealers in platers' supplies as composition; it is probably made of emory crocus and wax in some form, and sold by dealers in these supplies at from sixteen to twenty-five cents a pound; in a depot, it would be seventy-five cents. That, with the use of the felt-wheel on the engine or the lathe, will enable you to dress metal from the very coarsest file to the point ready for the finishing with rouge. It makes a quick cutting polish.

The subject of voting a sum for tabulating the skulls is taken up again, and after some excellent words by Drs. Peirce, Keely, McKellops, Rawls and Brophy, dropped again for lack of funds for this year. The different usual thanks are voted to all except the local newspapers. Short tributes are still paid to Dr. Dean and Dr. Hawxhurst.

Section on Dental Literature.

Dr. TAFT:* Report on Dental Literature. Mentions the new works appearing during last year, chiefly the book of Coleman, revised by Dr. Stellwagen; ten monthly dental journals appeared with from thirty-two to sixty pages, containing a large number of articles of real value to the profession. The British publications make 1692 pages a year, the German 1984, the Italian and Spanish 164, the French 948

*We intend to give a full report in some later number; the space for this number makes it impossible to give it in full.

—in all 4824, against the American 5400 pages a year, so that the latter exceed all the others together.

Prof. Mayr: At this subject I would like to make a few remarks; the French, Italian and Spanish are nothing but a reprint of American and English dental literature; the German are old and fogy. Have any of you read that fine book: Dental Quiz Questions, by Dr. Foster Flagg? I do not know, if he wrote it, or how much he wrote, but it is the funniest book in its line I ever read; if merriment promotes digestion, you ought to read it after dinner; it is a book where it would not make any difference in respect to the sense, if the words were divided differently. I hope that no dental school will adopt it.

Section on Dental Education.

Dr. Crouse:* We have a short report. Can anything now be said about dental education? Much has been discussed and no standard has been reached as to what constitutes a thorough dentist. Is it to be taken for granted that all dental colleges in existence, and those of the future, are to be considered reputable without consideration? If not, how is a board of examiners to determine which colleges are entitled to representation? With no fixed standard, it is utterly impossible to decide. Some have disputed diplomas from some colleges and recognized those from others much less reputable. All colleges of good standing should form an association fixing the standard. Your section believes the Association should require all colleges to give two full courses of lectures before graduation. If a student should have to spend more time, he would be more benefited; to allow them to graduate in one course is to reduce the quality of our graduates. Can such an association be formed and a two years' course be adopted? Also some other reform ought to be introduced, as the requirement of a good English education and a better training by their preceptors, as recommended in former years. Then, the State board of examiners would have no difficulty to decide which colleges are reputable dental colleges. Another advantage would be the reduction of the number of dental colleges; some of the worthless ones would be discontinued and many of the same class would never come into existence. The sentiment of the best practitioners is that we have too many dental colleges; we have nineteen, counting an embryonic one in Chicago, which is double the number of ten years ago, showing an increase in the number of schools out of all proportion to the increase of students.

*Full extract.

Dr. RICHARDSON : (?) I cannot agree with the speaker that we have not made progress; for in the forty-six years since I began, I can see such a marked progress in every department of dental science that I hardly feel myself in place. One thing a dentist should learn is that he should be an honest man in his education, to himself and his patrons, and he must be imbued with the idea, when patients come to him, that he gives them more than a favor, rather than to adopt the cringing, fawning manner in which many dentists treat their patients to get a job. This ought to be rooted out; we should more stand upon our honor as a calling, and let the public feel that we are conferring a favor upon them by performing the operation. Now, the idea of being jawed down by their saying that they will go to the place where they can have it done the cheapest, is demoralizing to the whole principle of the profession.

Dr. ATKINSON :* It is in vain to attempt to elevate the profession as long as we fall into the old lead. The idea that time has anything to do with the granting of diplomas, is darkness; I hold that any man who can prove that he is competent, ought to be indorsed; one, two or ten years have nothing to do with the acquirement of knowledge; they are only very insignificant. I am informed that there are schools who graduate pupils if they can answer yes or no, and a college in New York gave a diploma to a man who, on being demanded to come up to the requirements, threatened to leave. They ought to be honest first. We have room enough for graduates, but only when the fruit is ripe and not when it is only abundant and green. I take it that men who have the greatest ability are not always literally well educated, but they were men who had reason to comprehend what they were, before they understood what they are doing. It is the moral question that lies at the bottom, that gives us communicants and seekers of truth. That we should attain by the standard of our dental education.

Dr. PEIRCE :* It is indifferent to the public whether a professional man gets his education at one place or another, whether he attend college or not, but it is the ability alone which the public want. Before this idea is adopted, we must have a board of examiners, independent of the teachers; we must have a board beyond the teacher, and that board should have the authority to grant diplomas which entitle a man to practice the profession.

Dr. BARRETT : The idea of placing a diploma upon a man's value,

*Nearly verbatim.

and not the time he has been engaged in school, is a pretty theory! We have that theory in the State of Wisconsin; that is where we come out when it is left to the teachers in the school to determine the qualifications. We will have this state of affairs until the time arrives when the granting of diplomas shall be taken away from the teachers, and a board appointed by some competent authority; until that time comes, some check is necessary against the letting down the bars and opening the field for all manner of fraud.

Dr. ALPORT said that at Chicago no new dental college was forming, only the dentists had established chairs for dental surgery in the colleges of Chicago.

Drs. MORGAN and KULP think it a very dangerous practice.

Dr. BROPHY defends the step.

Close of the meeting.

MERRIMAC VALLEY DENTAL SOCIETY.

The twentieth annual meeting of this Society will be held in Boston, on Thursday and Friday, October 5 and 6, 1882.

The meeting promises to be of unusual interest to the dentists of New England, as many of the leading members of the profession in this country are expected to be present and entertain the company with new and original matter; and, in addition to the regular business of the meeting, the proposition to dissolve the present organization of the Society, and arrange for the organization of a "New England Dental Association," will be discussed—leading members of the profession (non members) from each of the New England States having been specially invited to be present and coöperate with the Society in perfecting arrangements for the reorganization.

A cordial invitation is extended to New England dentists who feel an interest in the matter to be present and lend their aid and influence, should the object meet their approbation.

For Executive Committee,

J. B. COOLIDGE, *Chairman.*

EDITORIAL.

We give our whole number to the publication of the proceedings of the American Dental Association at Cincinnati, Aug. 1–4, 1882. These proceedings do not claim to be a show that we can get a verbatim report; they are intended as a faithful and *interesting* report. To be interesting, we had to throw out here and there parts of the discussions. Some papers had to be left over. To do justice to the speakers, we have marked by foot-notes the degree of verbatim report we have given to a paper or speech. One of the most difficult things to obtain exactly is very often not the speech, but the name of a speaker. We should be glad to receive correction on this point. We marked the cases where the name of the speaker was doubtful to us. We furthermore do not intend to compete with the publication of the proceedings of the American Dental Association which the latter publishes, only these proceedings, appearing so very long time after the meeting, lose much of their freshness, and it is a pity if such a meeting does not get its transactions into print and before the public, ere it is forgotten that dentists met last year. The transactions are far more complete than our report, in which we gave more room to the discussions than to the papers. The work to be done, lying all on the shoulders of one already very busy man, was enormous, considering the short space of time. We have to beg special pardon for overlooking misprints and blunders. We hope they won't interfere with the sense.

We think it useful to give the opinion of two of our editors about that excellent book of Tyndall: "Floating Matter in the Air."

If every dentist applied half as much skill and care mounting a set of artificial teeth as is required to make *the teeth*, there would be less complaint of manufacturers. E.

To CASE-HARDEN IRON.—If you desire to harden to any considerable depth, put the article into a crucible with cyanide of potash; cover, and then heat all together; then plunge into water. This process will harden perfectly to the depth of one or two inches.

BIBLIOGRAPHICAL.

FLOATING MATTER IN THE AIR. By *John Tyndall.* Published by D. Appleton & Co.

The book recapitulates the former well-known experiments of the author to produce "optically empty" air, that is, air so free from dust that a beam of an intense light cannot be seen along its path through such air. He found that one of the means to free the air from such dust was by burning the dust in the air by red-hot platinum wires, or similar heating appliances. The dust in rooms, in a case cited by Tyndall, was 50 per cent. organic, but this probably depends very much on the locality.

Next comes a review of the researches of Pasteur, the well-known French "bacteriologist." It shows that a good chemist may be excellent outside of his proper sphere, because his training makes him very circumspect. A chemist with his sixty elements and numerous compounds has to be continually on the guard against any surprise from them, and he, more than any other branch of sciences, has to do complicated and tedious work to get at the truth and to exclude possible errors. "Here, forsooth, was a chemist rashly quitting his proper *metier* and presuming to lay down the law for the physician and the biologist on a subject which was eminently theirs." (!) But the chemist was right and the empirics in ℞ and Latin empty names were wrong. But the history of Pasteur's discovery is too well known to need relating. The application of the "germ theory," as it is now generally named, that is, the theory which supposes the origin of most contagious and very many other diseases due to the presence of lower organisms, to the treatment of wounds, by Lister, is well known and very interesting to read as it is told in the book.

It is interesting and proved by numerous facts by J. Tyndall, that no kind of filtering and passing the air over sulphuric acid or caustic potash was sufficient to destroy the germs.

Why in that book almost a whole chapter is given to the experiments of a Dr. Bennett, at Edinburg, who shows his incompetence in the single sentence that "air, subject to a boiling temperature, is so expanded as scarcely to merit the name of air, and that it is more or less unfit for the purpose of sustaining animal or vegetable life," we do not quite understand. Air subjected to the boiling point, and allowed to expand, has a density of $\frac{173}{273}$ or about two-thirds of common air.

If we want to obtain air of that degree of rarefaction by ascending a mountain, we find that we have to climb until the barometric pressure is about 500 *mm.* (20 inches), corresponding to about 3,000 *mm.*, or 12,000 feet, which is not as high as the altitude of Quito, South America, with its 100,000 inhabitants, where water boils at about 90° C. (100° F.). A chemist who works under this unwarranted supposition, does not seem to us to deserve the credit of a large part of a chapter.

By accident, Tyndall operated on breath, and found that the last air expirated was optically empty, while the first air breathed out contains many floating particles—Dr. Tyndall supposes from the lungs; we suppose rather the inhaled particles returning to the air, while only in the last particles of air they have been removed by filtering and adhesion to the lung cells.

Many other very interesting little facts are mentioned, but we cannot do anything but recommend very careful reading to every student, and not only the student but every thinking man. About the use of these things, we can only quote Tyndall's words: "What is the practical use of these curiosities if we exclude the interest attached to the observation of new facts and the enhancement of that interest through knowledge that facts often become the exponents of laws; these curiosities are in themselves worth little, ... but they become the antecedents of practical consequences. How does it act not upon a beam of light, but upon our own bodies? . . . ., etc."

How different blood and other tissue comport themselves when kept free from this dust, is shown strikingly by the experiments of Dr. Reklinghausen, of Würzburg, in which blood was kept "*alive*" for three weeks in small cups of porcelain under gas shades, but free from organic particles and dust. The heart of a frog was kept pulsating, removed from the body, more than a week. To obtain pure air for experimenting, the best thing to purify it is to leave it to itself for a sufficient time, in a small, closed chamber or closed vessels. Most interesting is the fact, substantiated by many experiments, that the last air coming from the lungs has lost its power of producing putrefaction.

Tyndall touches the question of "spontaneous generation," and his experiments seem conclusively to disprove other experiments in its favor. His experiments, which must be read in detail, cannot help forcing everybody to acknowledge the infecting power of common air, compared with air that has been allowed to remain at rest.

The last chapter is devoted to spontaneous generation alone. But, while it is very easy to make an extract of a novel, or even of a "paper" on some subject, it is entirely impossible to give anything like an extract from a work teeming with sharp logics and beautiful experiments, every one must read it himself. The importance of a knowledge of the "germ theory" just at present, where the question of chemical decay has been stirred up so mercilessly from its "well settled" state, is so self-evident that no one loving truth and knowledge need be told to read the book of Tyndall. It is not written in a deep, "scientific way"; it is common sense everywhere; it is so that every experiment can be understood by any man able to think.

Why Tyndall generally quotes the French authors in their original tongue, while he has the kindness to translate other authors, is not quite intelligible to us; and though it matters us personally very little, there are many readers who would like to be able to read every passage in a book without being forced to skip something, perhaps very interesting; and there are still, we are astonished to say, some people who do not understand French. The price, in filthy greenbacks, is \$1.50, but the value in knowledge and information is more than expressible in these besmeared pieces of green paper, or round, uneven discs of silver alloy.

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The "Germ Theory of Disease" having become so largely the *accepted* theory by the intelligent medical world, and as much interest is being manifested by investigators relative to the presence and effect of organisms in dental caries, it is with unusual pleasure that we call attention to the issue of a volume bearing the above title. A sufficient guarantee of its value is the name of its author. Perhaps a majority of the members of the profession will fail to see how "Floating Matter of the Air" has any connection with dentistry; such, however, do not recognize the fact that there is a growing belief that low organisms have a vast deal to do with the origin and maintenance of decayed teeth, and that no sound views of the etiology of decay can be held, to-day, without taking them into account. Independent of any direct bearing that these essays may have upon the near or remote subject of dentistry, they are full of matter of special interest to every scientific investigator. They embody the results of Prof. Tyndall's systematic and original investigations for several years past, and are presented in a clear, concise and most interesting manner.

The condensed beam of luminous light, which the author has

made use of so extensively in these experiments, constitutes, substantially, a new instrument, and is a powerful supplement to the microscope, revealing a wonderfully interesting world for investigation beyond the microscopical range of our best instruments.

These experiments seem to demonstrate beyond question that *the germinal matter from which Bacteria spring exists in ordinary air.*

This, of course, controverts the theory of "spontaneous generation," held by Dr. Bastian and some others, whose experiments, upon which the theory is based, seem to have been faulty, inasmuch as sufficient care was not observed to exclude from his infusions the *germinal* matter of the air—the importance of which had not then been understood, as now appears by the experiments of the author of these essays. Upon this point Prof. Tyndall throws a flood of light. Lengthy and minute though these experiments are, the reader's interest can scarcely tire, or his patience become tired. In fact, one's interest increases as the record is pursued and the great variety of experiments, with tireless pains-taking methods, point so strongly to the discovery of what must be considered as new laws and facts of nature.

That a large proportion of the dust of the air—often more than 50 per cent.—should be proven to be *organic*, or *germinal*, is a somewhat startling revelation. Also the statement that cess-pools, drains, etc., are not sources of *origin* of diseased germs, but rather that they form *favorable conditions* for the *development* of the germs that are found floating in the air, should change simply our theory, not modify our warfare against such places.

After a careful perusal of a series of his experiments, one cannot but regard the author's conclusions, or application, as modest and more than substantial. We can quote but briefly:

"There cannot, I think, be a doubt that the germs in the air differ widely among themselves as regards *preparedness* for development. Some are fresh, others old; some are dry, others moist. Infected by such germs, the same infusion would require different lengths of time to develop Bacterial life. And this remark, I doubt not, applies to the different degrees of rapidity with which epidemic disease affects different people. In some the watching-period—if I may call it such—is long, in some short, the difference depending upon the different degrees of preparedness of the contagium."

. . . .

"We have now to look a little more closely at these particles, for-

eign to the atmosphere but floating in it, and proved beyond doubt to be the origin of all the Bacterial life which our experiments have thus far revealed. We must also look at them as they exist in water, in countless multitudes, being as foreign to this medium as the floating atmospheric dust is to the air in which it swims. The existence of the particles is quite as certain as if they could be felt between the fingers, or seen by the naked eye—supposing them to augment in magnitude until they come, not only within range of the microscope, but within range of the unaided senses. Let it be assumed that our knowledge of them, under these circumstances, remains as defective as it is now—that we do not know whether they are germs, particles of dead organic dust, or particles of mineral matter. Suppose a vessel (say a flower-pot) to be at hand filled with nutritious earth, with which we mix our unknown particles, and in forty-eight hours, subsequently, buds and blades of well-defined cresses and grasses appear above the soil; suppose the experiment, when repeated a hundred times, to yield the same unvarying result, What would be our conclusion? Should we regard those living plants as the product either of dead dust, or of mineral particles? or should we regard them as the offspring of living seeds? The reply is unavoidable. We should undoubtedly consider the experiment with the flower-pot as clearing up our preëxisting ignorance; we should regard the fact of their producing cresses and grasses as proof positive that the particles sown in the earth of the pot were the seeds of the plants which have grown from them. It would be simply monstrous to conclude that they had been 'spontaneously generated.'

This reasoning applies, word for word, to the development of *Bacteria* from that floating matter which the electric beam reveals in the air, and in the absence of which no Bacterial life has been generated. I cannot see a flaw in the reasoning; and it is so simple as to render it unlikely that the notion of Bacterial life being developed from dead dust can ever gain currency among the members of the medical profession."

One of the most important of these essays is on "*Fermentation*," in which the author quotes quite largely from the investigations of Pasteur, Koch, Sanderson and others. We have given more space to a notice of this work than usual, because we regard it of vital importance that the dental profession should keep abreast with the advance of scientific discoveries of such a character. The wonder is that such a wealth of information can be placed within reach at so insignificant a sum as the price of this volume. S.

Operating Table and Laboratory.

"WONDERFUL INVENTIONS."

From the "Herald of Dentistry" we learn of another, and *latest*, wonderful invention of the age, through which is proclaimed "Glad Tidings to the Dental Profession."

This "wonderful invention" appears to be a sort of *Golden Calf* to which the profession are very respectfully invited to look, as did the Israelites of old, in their distress; and those who look are assured that they shall be saved. This *modern* wonder, though it has so much of the calf in its appearance, is in reality only a rubber dental plate covered with gold, and those who look thereon will be about as sure of coming to grief as were those of old of receiving life. However, the idol is to be set up, and ere long we shall see many a one *prostrate* before it.

The "glad tidings" will probably be to those *self-styled* dentists who only win success through displayed advertising; and to them such a golden image is truly desirable, being of a nature to induce a credulous public to accept without hesitation. Barnum rightly says: "The public are ever ready to be humbugged." Unfortunately, the irrepressible "P. T." is not the only one who is more than ready to render this willing service.

We know of no man in the profession who can prove conclusively that the ingredients entering into a rubber plate act medicinally on the system of those wearing them. At the same time, however, there is abundant evidence to the fact of evil influence on the mouth from nonconductivity of such plates—the influence in some cases being of so grave a nature that the whole system sympathizes, and the general health becomes greatly impaired.

We would be pleased if the Herald would inform us how this *non*-conductivity is changed to *con*ductivity by plating with gold. In so doing, a new *natural law* would be evolved, far transcending their present claims.

Inventive faculties would be better employed in striving for something of real merit, than in garnishing up old things, which by the means can become only "whited sepulchres, and full of all uncleanness." The *ideal* prosthetic denture has not yet been invented. Let us labor with that in view, and meanwhile use the best at our command.

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ORIGINAL COMMUNICATIONS.

REVIEW OF THE PROGRESS IN HISTOLOGY.

BY DR. S. E. DAVENPORT, OF NEW YORK,

Chairman of Section 1.

[Read before the Connecticut Valley Dental Society, at Amherst, Mass., June, 1882.]

The chairman of Section 1 desires to thank *all* the members of the section for the very cordial support he has received, and particularly those who have taken any notice of his appeals for aid, even though it may have been with a "not prepared."

The dentist should have a good knowledge of general anatomy, and an accurate understanding of the arrangement of the tissues entering into the formation of, and lying contiguous to, the buccal cavity. In England the student of dentistry is required to pass as rigid an examination upon anatomy as is the student of medicine. In this country a full course of dissection has been made compulsory at many of our dental colleges, while at the excellent institutions of Harvard and the Dental Department of the University of Pennsylvania, the instruction and requirements are in every way the same, for the dental as for the medical students, in both anatomy and physiology.

In those dental colleges where a course of dissection is not obligatory, many students shrink from taking the same, partly from feelings of disgust and horror at the idea of spending so much time in close proximity to the cadavera. That feeling soon disappears upon the use of the scalpel, and the testimony of all who are really interested in anatomy will probably agree with that of the writer, in calling time at the dissecting table both profitably and pleasantly spent.

(The department of physiology was accepted by a member of the section, but his necessary absence from home for several weeks has prevented the preparation of his report.)

The idea that animals and plants, however complex their structure, are composed of a limited variety of elementary parts, has been held for many centuries. Aristotle referred to it in his writings, while Galen, the father of medical science, went so far as to claim that what we now call tissues, muscle, nerve, bone, cartilage, tendon, etc., were the ultimate elementary parts, or "*partes similares*," as he called them. It would seem strange that Galen, and the anatomists of his time, should claim that in the "*partes similares*" they had arrived at parts no longer analyzable, did we not appreciate the difficulties which beset the path of the histologist in those days in the absence of the compound microscope. To be sure, we know that simple lenses were known to the Greeks and Romans over twenty centuries ago, but their use was confined to the generation of heat by the refraction of the sun's rays, and to the magnifying possible with the simple lens, until, in 1590, the Jansens of Holland combined the power of two lenses and formed the first compound microscope.

The next attempt at the discovery of the ultimate physical element was made by Haller, who in the early part of the eighteenth century promulgated the fiber theory, claiming that all tissues were composed of fibres and an interconnecting organized concrete. In the early part of the present century there appeared the writings of a large number of observers who claimed the fiber of Haller was not the ultimate element, but that it could be separated into globules, which, they claimed, would form fibers, veins, arteries, etc., by the linear apposition and connection of these ultimate globular elements. All these writers agreed that there was a structureless, semi-fluid, glue-giving, intermediate material of which some tissues, notably cartilage, were for the most part composed.

The cell doctrine, as it is called, had for its founders the two eminent German histologists, Schleiden and Schwann, who in 1838–9

published their views—those of Schleiden being based upon his study of the minute structure of plants, and Schwann's upon the application of Schleiden's conclusions to the histology of the animal tissues. There cannot be too much credit given to Drs. Schleiden and Schwann for their patient labor with the microscope, for the cell theory, although incorrect in its claims as to the presence of cells distinct and separate—the unit upon which all development depends—was a great advance upon all the theories previously promulgated, and was so beautiful when explained and understood as to stamp each student who gave it attention an ardent admirer of histology forever. The writer confesses that he was much grieved when first it was demonstrated to him that the cell theory was not tenable. There was something so satisfactory in the idea of being built up of six or eight different kinds of cells, varying in shape according to the special needs of the locality, and the student imagined he could feel the blood pabulum coursing through his arteries, and when it reached the capillaries, there came the gentle though discernible grasp of the cell nucleolus, which metamorphosed the pabulum into living matter—soon losing its life, however—being changed gradually into nucleolus, cell contents, and then formed material—this last being just outside that ever present but never seen "cell wall," which has, in the much controversy regarding it, been likened to everything from the skin of an orange to the halo about Cupid's head.

Then, too, if it was ever our misfortune to meet with a person whose good nature was not sufficiently developed to enable him to bear all of our peculiarities, under the cell doctrine we could charitably conclude that in his organization the squamous and polar cells had unfortunately been transposed, or that when he was formed, the usual variety of cells not being obtainable, he had been obliged to close out a job lot of perhaps "*wandering*" cells. Now all is changed. No longer can we liken the human frame to a chimney, built up like it with cells for bricks, entirely separate and individual except for the mortar-like connection afforded by the intermediate formed material.

Let us hope that with the loss of our chimney all *smoke* has also vanished, and that the views held to-day by Carl Heitzmann and his disciples may prove as true through time as to the earnest student they now appear to be.

Carl Heitzmann was born in the year 1836 at the southern military boundary of Hungary, where his father was on duty as an army surgeon. Inheriting a strong liking for medicine and surgery, he studied these sci-

ences first in Pest, the capital of Hungary, and Vienna, Austria. In 1859 he graduated with honor at the University of Vienna, and was immediately elected assistant surgeon to the late eminent Prof. Schuh. In 1862 he became associated with the late Prof. Hebra, who soon published the greatest work on skin diseases in existence—six of the ten volumes being illustrated by Carl Heitzmann.

During the next five years Dr. Heitzmann pursued surgical, anatomical and histological studies, and illustrated and issued several works upon surgery and anatomy. His Manual of Surgery, two volumes, has reached five editions and is translated into several languages, while his Anatomy, also two volumes, containing 600 large wood cuts, has reached two editions. His first histological researches were published in 1868, and were upon the minute anatomy of the small intestine.

In 1872, '73 and '74 there appeared in the Transactions of the Imperial Academy of Science, in Vienna, various papers by Carl Heitzmann upon general histology, the new and peculiar claims of which, although scoffed at at the time by the originators and supporters of the cell theory, were destined soon to overthrow that theory and to make converts of many who at first were loudest in their jeering. Early in the year 1874 Dr. Heitzmann was elected Lecturer of Morbid Anatomy in the University of Vienna, where he was in the direct line of promotion to the Chair of Morbid Anatomy, to succeed the late Rokitansky, but on account of the new views upon histology held by him, and the jealousies of his fellow-workers, another man was elected to the professorship, Carl Heitzmann was disappointed, and with a desire for surroundings less oppressive, and with less deep ruts in which he was expected to run, came to New York toward the end of the year 1874 and established his laboratory.

It may be stated here that Carl Heitzmann made most of his discoveries while working in the laboratory of Stricker, Professor of General Pathology in the University of Vienna, and had not Stricker worked against him and refused to accept his discoveries as true, Heitzmann would have had the professorship he wanted. However, in 1880, Stricker published the results of researches of his own, principally regarding the cornea, and accepted fully Heitzmann's claims of six years previous. The English physiologist, Drysdale, in 1865, compared the cell to a gun barrel without lock or stock—so imperfect did the theory seem to him, and this was after Lionel Beale and Max Schultze had established their protoplasma theory, which they tried to conform to the cell theory. Heitzmann felt the same dissatisfaction

with the so-called cell doctrine, though with greater force, and resolved to prove it if true or to *dis*prove it if it was, as he thought, false.

Upon Schwann's investigation of the constitution of cartilage, his cell doctrine was to a great extent based. Heitzmann's bioplasson doctrine was formed from what he saw in his examinations of the same tissue, though it would seem to be the least suited of all tissues for the demonstration of his peculiar claims, on account of the large proportion of basis substance. Heitzmann found the formerly supposed non-connecting cartilage cells to be masses of living matter, the nuclei and granules of which were connected by fine lines of a protoplasmic nature, making a network within the corpuscle, and that each corpuscle was connected with all others in the vicinity by means of—to use the appropriate term suggested by Prof. L. Elsberg of New York—a bioplasson reticulum, which pierced the glue-yielding basis-substance in all directions. Dr. Heitzmann has demonstrated that the formerly so-called protoplasm of tissues in general is not, as was supposed, structureless, but that it has a reticular structure—the reticulum being the living matter proper, on the contraction and extension of which depends the change of shape and the locomotion in the simplest animal organism, the amœba, as in the highest organs of man. Not only is there a connection by means of the reticulum between all portions of living matter in the same tissue, but the bioplasson of each tissue is intimately connected, by fine off-shoots, with that of the tissue lying contiguous to it. This body of ours, then, in place of being made up of colonies of structureless amœba, as claimed by Hæckel and Huxley, may be said to resemble an enormous amœba, with a bioplasson reticulum absolutely and literally connected throughout, enclosing in its meshes a lifeless fluid, while the meshes of the accompanying basis-substance enclose a glue-giving material, which is the lifeless fluid above referred to, chemically changed and solidified. Isolated lumps of living matter are found only suspended in the liquids, blood and lymph, and in the different secretions.

Two years ago A. Spine, of Vienna, treating cartilage with alcohol, discovered a ready and simple means for demonstrating the connection of the cartilage corpuscles — so simple, indeed, that to-day an eye little experienced, and with comparatively low power, can see what in 1873 Carl Heitzmann maintained, based upon rather tedious methods of staining the cartilage with nitrate of silver and chloride of gold. Carl Heitzmann's laboratory comprises the entire fourth floor of his residence and is a convenient and well-lighted apartment. The

number of work tables, at first four, is now seventeen, this large increase having been necessitated by the rapid filling up of the classes, over 700 gentlemen having studied there since the laboratory was established.

The study of the minute anatomy of the teeth has made remarkable progress during the last four years, and principally through the efforts of Carl Heitzmann and a few co-workers, among whom is Dr. C. F. W. Bödecker of New York, who has contributed the most knowledge to the departments included in this section. It may be well to refer briefly to a few of the most important discoveries by Dr. Bödecker and others concerning the structure and relative arrangement of the organic and inorganic constituents of the dental organs—based, all of them, as far as possible, upon C. Heitzmann's bioplasson doctrine.

Much advantage was gained by these gentlemen in not confining their examinations to specimens cut from the dried tooth—it being easily seen that in the process of drying, the soft tissues would shrink, lose their form and occupy much less space than during life. Then, too, dried specimens have to be ground; consequently, the spaces (lacunæ, tubuli, etc.) would collect more or less dirt, which would confuse the examiner, dirt not always having its name upon its face so that it may be recognized as such. Fresh specimens were cut with the razor from teeth which had been immersed in a one-half to one per cent. solution of chromic acid.

It is not necessary to go into the late methods of preparing specimens, which are many—all tending toward the preservation of the form and natural position of the soft tissues and the prevention of the accumulation of foreign substances. The dentinal tubuli radiate from the boundary of the pulp canal, differing in curvature according as they are directed toward crown, neck or root of the tooth. Each tubule or canaliculus runs in a wavy course, branching usually only as it approaches enamel or cementum, and contains a slightly beaded fibre which is smaller than the calibre of the canaliculus. From the periphery of these fibres fine off-shoots may be seen, with high power, which point toward corresponding openings in the walls of the canaliculi, though they are often so fine as to prevent the examiner from really seeing their exit through these little openings; but in stained specimens a fine reticulum of bioplasson can plainly be seen piercing the basis-substance between the canaliculi, and its connection with the dentinal fibres is shown at many if not all points. The canaliculi and their contents branch and ramify in an exaggerated manner as they

approach the enamel and cementum, the increased sensitiveness of dentine at these points during dental operations being accounted for by the presence of a larger proportion of living matter. The dentinal fibres are connected with the odontoblasts of the pulp in the growing tooth and with its protoplasmic bodies in the adult tooth, no regular odontoblasts being present. The periphery of the dentine next the cementum does not contain canaliculi, a finely granular layer varying in thickness being found here, the bay-like excavations seen at the juncture of dentine and cementum often containing protoplasmic bodies possessing off-shoots which serve to connect the branches of the dentinal fibres with those of the cement corpuscles. This layer of protoplasmic bodies between dentine and cementum, as also between dentine and enamel, has been named by Dr. W. H. Atkinson the interzonal layer.

The connection of the dentinal fibres with the cement corpuscles is also established by the anastomosis of the fibres, or their large branches, with the coarser off-shoots from the protoplasmic bodies of the cementum, and by the fine reticulum of the basis-substance of the dentine passing into that of the cementum. This is the only method of connection at the neck of the tooth, the dentinal reticulum starting from small pear-shaped enlargements on the terminations of the fibres.

The connection can also be seen between the living matter of the cementum and the nucleated protoplasmic bodies of the pericementum, excepting at the neck of the tooth, where the cementum is covered by epithelial elements which turn over into the epithelial coating of the gum, and closely resembling those comprising the so-called Nasmyth's membrane which covers the enamel of the young tooth.

Tomes describes the human enamel as a structure containing but 3.5 per cent. of organic matter, the remaining 96.5 per cent. being lime-salts. He tells us of the enamel rods, has much to say about their shape, their wavy course, etc., and then adds: "The rods are solid, are in absolute contact with one another and have no demonstrable intervening or uniting substance."

Dr. Bödecker also admits the existence of the enamel rods and agrees with Tomes in regard to their course, etc., but he sees and demonstrates to others the existence of what he calls "enamel fibers" of living matter in the interstices between the rods. Branching from these fibers at right angles with them there may be seen minute conical fibrillæ which traverse the space between the fibres and the contiguous

rods, enter the rods and are then lost to view, though in the thoroughly decalcified specimens these fibrillæ may be seen traversing the substance of the rods proper, and uniting to form a network similar to the reticulum in the basis-substance of the dentine. Tomes informs us of the existence of organic matter in enamel, but does not tell us in what form or at what points it may be found. Bödecker not only gives us full information in regard to the position of the organic matter, but he prepares specimens and adjusts them so that the novice can see this fine reticulum in the enamel rods.

Dr. Bödecker has also demonstrated the morbid changes which take place in the formation of secondary dentine and in inflammation of the peri-cementum and pulp—all of which has been written up in the able manner characteristic of him, and published in the Cosmos.

Dr. Frank Abbott has spent much time in the examination of tooth caries, and, though the subject is too formidable to be mastered by the researches of one man, he has certainly added much to our knowledge of that pathological condition. He is at present pursuing studies concerning the changes of the dental tissues during the process of absorption of the teeth of the first dentition.

A very valuable book, and one which we will all want, is soon to be issued from a New York press. It is from the pen of Dr. Heitzmann, is upon general histology and microscopy, and its title is "Microscopic Morphology." It will contain a complete explanation of Dr. Heitzmann's views as well as the researches of a number of his co-workers, including Dr. L. Elsberg of New York, and it will not only be a very interesting work but the most valuable one for the advancement of science which has been published for years.

Every dentist present should take the first opportunity of meeting Dr. Heitzmann. He is a large-hearted, genial gentleman, very courteous, and, of course, very enthusiastic upon the subject of microscopy. His aim is, he says, to raise the standard of dentists in this country in their strictly scientific attainments, and I am sure he has already done much for the profession in that direction.

His views, although nearly revolutionary in comparison with those held by previous histologists, are not like a sieve—they will hold water—and I defy the greatest unbeliever not to be converted to the bioplasson doctrine after looking at Dr. Heitzmann's specimens through the microscope and listening to one short course of his lectures.

This report cannot close without referring to the great friendship existing between Dr. Heitzmann and our own dear Dr. Atkinson, or

"Papa," as Dr. Heitzmann delights to call him. When Carl Heitzmann first came to this country, Dr. Atkinson, becoming convinced of the truth of the bioplasson doctrine, did much to introduce him, and assisted in making the laboratory the success which it soon became; and to the cordial support given by Drs. Atkinson, Mills, Bödecker, Abbott, and a few other prominent dentists, to Dr. Heitzmann's views, is due his great interest in the profession at large, and his desire to add to our knowledge of the departments of Section 1.

A BRIEF DESCRIPTION OF THE MICROSCOPE STAND.

BY DR. A. M. ROSS, CHICOPEE, MASS.

[Read before the Connecticut Valley Dental Society, at Amherst, Mass., June, 1882.]

Some apology is due the gentlemen present, for presenting this paper, who are perfectly familiar with the subject, and as such an apology I will explain that it has been thought proper to commence at the very beginning, and describe the instrument that is necessary in the study of histology, that is, explain to those who desire to know the best instrument, reasonable in cost, that may be procured of dealers in microscopes. I have not known how to prepare such a paper and make it interesting to all alike, but I believe that the advice I have gathered from such authorities as Drs. Carpenter, Seiler, Frey, Phinn, and from personal friends who are experts in certain branches of microscopy, will be of value to any one who wishes to buy a stand.

I will briefly refer to what the microscope consists of: There are two kinds of microscope—the simple and the compound. The simple form consists of a single lens of one piece of glass, or one lens of two pieces of glass cemented together with Canada balsam, this lens having a certain working or focal distance from the object. The compound instrument—the subject of this paper—in its simplest form is composed of two lenses, the object lens and the eye lens, supported in a brass or other metal tube.

The difference between the simple and the compound instrument consists chiefly in this: With the simple microscope, the object is looked directly at, which may be more or less magnified; with the compound instrument, the object is more or less magnified by the object glass, but the image that is produced by the objective is inverted; the image thus formed is further enlarged by the eye-piece, so that

the image of the object as thrown upon the retina is reversed. There are many different patterns of stands, but of late years there is but one model that is much patterned after. It is known as the Jackson model, and is without doubt the best model for a microscope ever designed. In describing the several parts of the stand, this fact will be apparent.

The foot of the microscope demands the first attention, it being the foundation upon which the rest of the instrument is supported; it is one of the most important parts. The low, broad, tripod form of foot, so constructed that the body of the stand at any angle of inclination will be held firmly, is the best form. Upon such a foot, the tube supporting the optical parts will not vibrate.

It is believed that any stand the tube of which cannot be inclined, would be rejected by any sensible person—unless, perhaps, by those having extraordinary good backs—because unfit for protracted work.

Usually, between the foot and the body, there is a single pillar, or two pillars, on which the body is hinged at its center of suspension. That part of the body attached to the pillars is called the arm, and in the Jackson model this arm is a solid piece of metal. It is the belief of my friends, and my own, from considerable experience with different styles of microscopes, that the greatest steadiness is secured when the arm is swung between two pillars on trunion joints, though a low, heavy single pillar with cradle joint gives very great steadiness to the body.

The arm is so constructed in this model that the main tube, which rests upon it, is supported by the arm a considerable part of its length. The value of this feature in contributing to solidity is at once understood. The rapid movement of the tube is made by slide, or rack and pinion, or by chain and wheel. Some instruments are made so that the coarse adjustment may be made either by sliding the tube, or rack and pinion, at will. The properly made rack and pinion is the best, and it is the most generally preferred if it works freely, smoothly and noiselessly. There should be no loss of motion, and the object in the field of vision should not move when operating the milled head of the pinion; for, if it does, the workmanship is poor, or the design of the stand is upon a poor plan. If this coarse adjustment is first-class, medium power objectives may be readily focussed by it.

The stand should be furnished with an excellent, fine adjustment, and it should operate the whole body. The most convenient place for this adjustment is at the top of the arm, under the tube. Some mi-

croscopists prefer the fine adjustment located on the end of the main tube, near the objective, and it is practically just as well there; but theoretically it is not correct, because there is caused a slight alteration in the length of the tube and optical parts.

The main tube should contain a draw-tube, so that with the glasses in position the length of the whole may be regulated to ten inches. Some stands have the draw-tube provided with a stop, which is very convenient in obtaining the regulation length—making it unnecessary to measure the tube at each change of glasses.

The ends of the main tube and of the draw-tube have apertures and threads of standard size, known as the "Society Screw." Some stands are provided with a mechanical stage; such provision is always expensive, and except for special purposes, they are not valuable. A stage perfectly plain, with clips to hold slides, or, better still, a plain stage furnished with a carrier, is better for ordinary purposes than one having mechanical movement.

The stage may be rectangular or circular in form. A stage made of heavy plate glass, rectangular in form, set in a metal frame to give additional strength, is an excellent style; a circular stage, that may be revolved, is very good for some kinds of investigation, and when provided with a glass stage and carrier, to be slipped on over the other, nothing better could be wished for.

Beneath the stage is the sub-stage, which is quite useful in various ways. It usually carries the diaphragm plate, that has apertures of different sizes for reducing the light directly transmitted to the object, or reflected from the mirror. It carries the condenser of light to transparent objects; the polarizer of the polariscope; the different kinds of illuminators, etc. The sub-stage on the cheaper stands is fixed to the under surface of the stage, but it is best when attached to an independent bar or the mirror, because the light condenser can be easily and more accurately focussed if its carrier is on a bar, than when the adjustment has to be made in the sub-stage itself.

A great many people prefer a binocular instrument to a monocular, because they like stereoscopic vision of the object; but stereoscopic vision is only possible with low-power objectives, and when the higher powers are in use, the binocular is converted into a monocular by cutting off the prism at the junction of the two tubes. The binocular is the more expensive of the two, and there is no practical gain. Both eyes should be kept open in using any microscope, and then there is no strain or injury to the eyes. This is accomplished easily by buy-

ing or making an eye-shade that will fit the outside of the upper end of the tube, one end of the shade extending either to the right or left eye, at will, and bringing before the unused eye a broad, opaque surface.

I have herein outlined all the salient points composing a good microscope, and not a large outlay in money is necessary to procure a stand having these points, and more too.

One thing more should be remembered. It is conceded by most all familiar with the microscope, that the day of the very large, heavy, expensive instruments is past. The smaller, more compact and lighter stand, with its parts accurately proportioned, is in great demand now, and that demand is increasing constantly. The large stands referred to have their special aptness; outside of that field of usefulness, they are great, cumbersome pieces of furniture. This paper has been devoted to the dry details of that part of the compound microscope aside from its optical parts, and the most interesting and important part of the subject is left for a possible future consideration.

SOCIETIES.

Meeting of the Connecticut Valley Dental Association, At Amherst, Mass., June 29, 1882.

Afternoon Session.

Dr. Cutting, of Barre, is elected member of the Society.

Next subject: Report of Section 5.

Dr. Parker *On Base-Metals:* About two years ago a clergyman of some seventy years of age came to me to have teeth extracted, and a plate inserted. There were about twenty teeth in his mouth. I extracted them, and about two months afterward put in a rubber plate. In one year and one-half from that time he came to me with softening of the gums, which had amounted to considerable. They were spongy to quite an extent and, on the whole, it was quite a discouraging look. He thought he would have to resort to a gold plate, and that this would remedy the influence of the rubber plate. It was about at the time of the meeting at Springfield last year. Through the kindness of Dr. Atkinson I had made plates with Reese's metal;

I put the teeth on the model, about the same as for rubber, and sent them to him to cast them into Reese's base-metal. It was returned to me completed, and three months after they were inserted in the mouth the gums were very much improved, the softening was somewhat, and the inflamed condition of the gums was much improved. I have seen the gentleman several times since; each time there is an improvement in the gums; the plates are very heavy on account of the fullness I had to give, and not being experienced, I made them too thick. The plates would weigh as much as three or four sets of rubber, but the gentleman did not mind anything about this. They were nicely adapted, and where there had been injury of the gums or where the plates had been too high or low, it had not made that angry sore which rubber does usually produce; slight scraping or paring would remove the trouble, and the gums now have nearly normal hardness and density. The gentleman, of course, is perfectly satisfied, and so am I. I feel that it is something that will prove successful. If persons of twenty years commence to use rubber plates, the absorption of the gums, when they grow older, must be frightful, and I think by plates of this metal we may greatly prevent this evil. I do not advertise this metal, but I think it is what we need.

Dr. STRANG: I would like to inquire if the upper plate was made without air-chambers?

Dr. PARKER: It was.

Dr. SEARLE: What is the expense of this plate, as compared with rubber?

Dr. PARKER: Dr. Atkinson can better answer, as he has, up to the present, supplied us with these plates. I put this plate at the same price as rubber, because of the special circumstances of the gentleman.

Dr. SEARLE: But that you cannot do ordinarily. What would you ordinarily charge? About twice as much as for rubber?

Dr. PARKER: About $25 would be a fair price, comparing with $15 for a rubber plate.

Dr. SHEPARD: I present a regulating case with the models before and after treatment, and the plates used. The patient, aged 17, fitting for college at Exeter, N. H., came to me in April, 1881. He had the right upper central incisor knocked out, when a boy, by the kick of a horse. You will notice that the left central and right lateral are in contact, the original space between them being obliterated, and that the upper molars and bicuspids strike inside the lower—in a word, that the upper jaw is contracted. Dentists who saw the case previous

to his coming to me, advised the extraction of two lower teeth, so as to make the lower jaw smaller, to correspond with the upper. I judged that such treatment would be very improper, and that the upper jaw should be so expanded as to restore it to its original size, and then to supply an artificial right central in place of the one lost. A main argument in favor of this course was that the contour of the face would be improved, and its intended character restored. My first effort was to move out the molars and bicuspids, doing nothing to the front teeth. Soon after this was commenced, and little progress was made, he wished to go home to Illinois for his summer vacation, and I made for him to wear during the whole summer this plate. It is made of vulcanite, filling the roof of the mouth ; there are two gold springs or levers attached to the back of the plate—one to press against the right canine, the other against the left lateral. You will notice that the right lateral and left central had no pressure against them, as they would be pressed out rather than back by such pressure. The plate could be easily removed for cleaning. When he inserts it, he has simply to spring the levers together and press into the mouth. The next model shows the condition on his return in the fall. The constant gentle pressure upon the cuspid and lateral has not only moved them, but by their contact with the posterior teeth, the bicuspids and molars are so changed in position that the occlusion with the lower teeth is all that is required. There is, you see, a space between the moved right cuspid and the right lateral, and another space between the left central and the moved left lateral. The right lateral and left central were still touching at their cutting angles, with the V-shape space between, as at first. I then showed him how to model wedges of wood to wear between these two teeth. In a few weeks he had these teeth forced back to their proper positions, closing the spaces on either side, spoken of before—the space between them being of the size of the lost right central. I now made a suction gold plate with a porcelain tooth, which at the same time supplies the vacancy and acts as a stay-plate. The teeth occlude perfectly, and the face is restored to its proper contour. The main point, which is, I think, original and new, first presented to the profession, is the manner in which my springs or levers may easily be fixed in a vulcanite plate so as to be removed for bending or for the substitution of a new spring without having to make over the plate. The spring is fixed in a socket or bush, which is made by taking the spring itself, or a wire of the same size, and making the socket end either square or triangu-

lar; then wrap around it tin foil of good thickness, and about this wind binding wire; the spring or wire with its surrounding tin foil, etc., is pressed, in the proper position, into the gutta-percha trial plate, as you would a spring which you were to vulcanize in, and then invested as usual and vulcanized—the wire serving as a core to prevent the socket collapsing under the pressure during vulcanization. When the plate is vulcanized, you have simply to withdraw the wire, leaving firmly impacted in the vulcanite plate the tin foil and binding wire, making a socket or bush in the plate in which to place the spring or lever which you are to use in the mouth. This spring may be fastened in by gutta-percha or shellac, or even a fiber of waxed silk; but if you have a tight fit, nothing is necessary, any tendency to turn being prevented by the square or triangular shape of the socket. For springs I now use generally the spring steel wire known as "piano wire," the invention of Dr. Coffin of London. For the second point of interest, I ask you to notice how sharp and definite these models are which show the occlusion of the teeth, or the labial and buccal aspect of the teeth, when closed. A common way to take such impressions is to let the patient bite into a mass of wax or impression compound, and then mould it carefully about the teeth. The chief difficulty in getting accurate models this way is that you are not sure the teeth are tightly closed or in exactly the proper position. To get such models I have had made special cups, unlike any in the market. You can make them easily of any plate, such as German silver or white metal; cut the plate into strips of one-half to three-quarters inch in width, of suitable length; bend these into proper curves and solder on handles, which also will serve as stiffeners, or you may make more stiff by doubling the plate. To use this cup, heat your impression material and place it in the cup; have the patient close the teeth tightly and hold so; then, passing the cup inside the lips and cheeks, make *gentle* pressure, *very slowly*, and the impression material will conform to all the irregularities of surface and even press between the teeth and up into the space between the upper and lower incisors. When cold, let the patient open the mouth, and then remove the impression. You can in this way get perfect models of the outside of the closed teeth, even including the molars.

Dr. STRANG: I would like to ask Dr. Shepard if he had any trouble in using black rubber?

Dr. SHEPARD: Not more than with the other. I do not remember having seen any porous rubber.

Dr. STRANG: I am very well acquainted with a gentleman who had considerable experience, and had experimented considerably with black rubber, and he tells me that there is no rule by which he can be assured that the black rubber plate will come out perfectly. He has experimented considerably with it.

Dr. DAVENPORT: I never had a porous case. I take about one-half hour getting up to the point of vulcanization. I run it to about 315° F.

Dr. MORGAN: I think that the coating of the mouth is easier removed from black rubber than from red. I do not believe in rubber generally, but I prefer black rubber to red because of its greater strength and density. It has about ten per cent. more rubber than the red; I treat it like red rubber, and I cannot say that I have had any porous plates; I run up to about 360° or 370°. The plate may be a little more brittle, but it is strong and dense.

Dr. SEARLE: Do you vulcanize the same length of time?

Dr. DAVENPORT: Yes.

SECTION III.

Dr. E. S. NILES, chairman of the section, reports:

The organization of the sections, their plan, etc., have been rather indefinite to me. Having had no consultation with members of section 3, I have sent notes to quite a number of members asking them to write something for us, but have received no encouraging replies. What I have to say, as chairman of the section, will be upon three subjects: amalgam, gold, dead teeth.

Amalgams: A great deal has been said about amalgams, and I think it has resulted in good. I think at present we have better amalgams than ever before, and it is due to the exclusion of metals which are inert. The best amalgams that we have are made of inoxydizable metals; we have the tin, silver and gold amalgam. Gold does not oxydize at all in the mouth. The only metal which oxydizes, or rather sulphurizes freely, is silver. Silver is injurious in amalgams because it sulphurizes so easily by the action of sulphuretted hydrogen. If we could get rid of the silver and use other metals that do not sulphurize so easily, it would be a great improvement; tin and mercury, as used on the back of mirrors, very seldom tarnishes. Silver gives to amalgam strength and hardness—the more silver the harder the amalgams. Gold, silver and tin are the best metals now in use, and the less silver the better. We know how the old Lawrence amalgam oxydizes and sulphurizes, because it contains silver, copper and platinum, which latter, by the way, is inert.

The subject of *Gold Plates* in the mouth is an interesting one for discussion. Possibly the older dentists can speak better on it, from their great experience, than I from my knowledge. The gold for dental plates is alloyed with copper and silver; both metals tarnish. I have used the alloy which Hood and Reynolds sell, and that which White prepares, and in every case I think the plate has tarnished more or less; to obviate this, it occurred to me if we could use platinum in quantity just enough to stiffen the gold, we would get a plate which would not tarnish, because neither of the metals tarnish. (A piece of this alloy is shown). It seems to me to be a great improvement. I use this preparation in my practice.

Dead Teeth have been a source of annoyance since I commenced the practice of dentistry, but the difficulty I have experienced is, I believe, to a great extent due to an imperfect understanding of the trouble in hand. I must confess to have associated the exciting cause of abscessed teeth with the apex of the root at the point where the so-called secreting sac or abscess is attached, and, in my treatment, the main point has been its entire removal, and the disinfecting of the root preparatory to filling, and I believe, so far as one may judge from the various processes recommended for the treatment of dead abscessed teeth, such as drilling through the canal or the alveolar to the apex. Treating with chloride of zinc, carbolic acid, creasote, and aromatic sulphuric acid—all these, it seems to me, point to a misunderstanding of the part to be treated, and that the result to be attained very largely, if not wholly, depends upon the entire removal of sac and fistula first, then of course the tooth to be cleansed and filled. At a recent meeting of the Harvard Odontological Society, Dr. Whitten, of South Boston, reported the successful treatment of forty cases of dead teeth by simply washing out the canal with warm water for several days, then drying the substance of the tooth with cotton and the hot-air syringe, saturating it again with alcohol and filling with gutta-percha. After some study of the subject, I have come to the conclusion that this is the most scientific treatment I have known to be adopted, for when we look at the condition of things carefully, we find that really the only dead and offending thing is the tooth. Remove that, and ninety-nine cases out of one hundred that locality becomes healthy and normal; but, if the tooth is to remain with normal surroundings, it must be rendered clean and free from decaying organic matter, which constantly poisons the soft surrounding tissue. The exciting cause, then, after

the death of the pulp, is the continued decomposition of the organic substance in or of the tubuli and dentine. The gases and decomposed matter not finding a ready outlet through the crown, force their way through the canal to the apex, and ultimately by a fistulous opening to the surface. This dead product is poisonous to the tissue, and nature protects the more distant parts by forming a thick connective tissue wall first at the outlet in the root, and finally along and around the whole course of the canal. We have, then, the abscess originally and primarily confined within the tooth limited to pulp-chamber and canals, but the so-called *secreting sac and fistula* are only the abscess tracks formed to convey away matter from the tooth. No doubt this canal or "fistula," through its entire length, contributes largely to the product that appears at the outer orifice, but this is due to the action of the gases or matter upon the connective tissue walls, as they traverse the track away from the tooth. We will not, however, forget that this condition of things may have existed for perhaps many years, and until nature fails to protect the more distant parts, then a secondary exciting cause may exist; but I believe these cases are exceptional and rare, as the most severe cases are cured by the removal of the abscessed tooth. Basing my treatment upon this view of the trouble, my efforts are mainly directed to the pulp-chamber and canals, getting the best opening to these parts possible, drying and cleansing freely with the various disinfectants and antiseptics, and when this is done, thoroughly dry, as Dr. Whitten recommended, finally sealing with the well-known solution of gutta-percha and chloroform, and filling with gutta-percha. The abscess track may be left alone, and if the work has been done thorough, there will be no further use for it, and its absorption will be a matter of a few days or a week. We often meet with crooked roots; in such cases, in my judgment, it is not bad practice to extract and treat in the way already described, but if necessary to excise any portion of the root or expose the cement or dentine, it should be carefully covered with gutta-percha. Replace the tooth before inflammation in the socket sets in, and fasten, if necessary, as judgment and the case may direct.

Prof. CHAS. MAYR: If it might not seem immodest, I would like to give my opinion about the odor in those cavities and abscesses of teeth containing ichor or sanious pus. I do not suppose that so much of it is due to sulphuretted hydrogen SH_2 as to other sulphur-and-oxygen compounds. The odor of sanious pus is so much more offensive

than that of SH_2 that I presume it is to a large extent due to aldehyde-acids and sulpho-compounds of organic and complex nature. Of course SH_2 may be present, too, but the offensiveness of the odor is due to different substances. All those who have to work with SH_2 get used to it; it does not smell very bad, after all. I suppose that the odoriferous principles of ichor, etc., is due to the presence of the same substances which produce foul breath, foul alvine, and stomachic exhalations, etc. These substances have been but little investigated, but we can produce them artificially by an interesting process. If we heat caustic potash with a little bread, butter, meat, etc., to a certain point, dissolve the resulting mass in water and add an excess of dilute sulphuric acid, we obtain an evolution of gases, presenting strikingly the odor of alvine exhalations and foul breath, after the ingestion of the above articles of food. This fact was discovered by Prof. J. v. Liebig, and I myself saw the experiment performed by him. It will give us some clue as to the nature of these smelling substances. By melting thus substances with caustic soda, we obtain acids which are capable of higher oxydization—acids which contain aldehyde-groups in their constitutional formula; the oxygen to transform meat, etc., into these imperfectly oxydized acids, is derived from the air in which we melt the substances. If we add afterwards sulphuric acid to the mass, these acids are probably set free, and we get their respective odors. I, therefore, consider this odor due to the formation of such or similar compounds by the imperfect supply of oxygen from the blood; a perfect and properly arranged supply of oxygen oxydizes them higher, and thereby they become different substances with less offensive odor.

Dr. NILES: But is not there hyperaemia around an abscess, and therefore an excess of blood?

Prof. MAYR: Yes, but passive, venous hyperaemia with deficiency of oxygen; some oxygen is supplied, but not enough, and the products accumulate.

Dr. SHEPARD describes a case of peculiar abrasion on almost all teeth after a violent typhoid fever in a young patient. The diseased soft mass was ground off and the spots polished; no recurrence of the decay followed.

Dr. NILES: Do you recommend the use of tannic acid?

Dr. SHEPARD: I recommend it.

Dr. NOBLE: In what form do you use the tannic acid?

Dr. SHEPARD: In the form of powder given to the patient to make the proper solution himself.

Dr. PARKER : Do you account for the effect on the teeth by the action of acids?

Dr. SHEPARD : I am not prepared to say so. It is possible that the history of the case might lead to the conclusion that it is the result of the rather super-abundant mucus or deficient saliva, or undiluted mucus, which is the same thing. The softening of extensive surfaces of the tooth would lead one to say it might have been from a solvent alkaline. I do not pretend to be enough of a chemist to answer these things.

The question is asked if the spots were soft.

Dr. SHEPARD : Not soft but friable, a little brittle ; you could scrape them off with an instrument ; it could be ground, but it did not scale off.

Dr. NOBLE : Have we not all seen this state of affairs? If I understand rightly, have we not seen it often as the result of simple neglect? I have seen a large percentage of the six year molars in the mouths of children presenting the same state of things.

Dr. ATKINSON : This is a very interesting case, and I am not impressed with its being rare. It is not the result of imperfect organization, because the lines of decay do not follow the lines of tooth development ; it is a local action, not by reason of the lack of nutrient power, but something actually has worked on it. One or two suggestions : workers in bromine factories are liable to certain diseases of the cartilage of the nose ; they have a twitching and itching, but the whole sometimes passes without any sensation ; a waste of tissue takes place and the septum is perforated ; a very high percentage of those engaged in the work suffer in this manner. May be that this may wake up some time inquiries in this direction ; at least, what we have had of knowledge does not account for this state of things.

Dr. STRANG : About eight years ago I had to do some operations for a lady ; she was 45 or 46 years old, and had a beautiful set of teeth ; every tooth was like a pearl. She was taken violently ill and became insane ; was under treatment from four to six months. Perhaps three or four months afterward she came into my office again, and upon examination of her teeth, I was amazed to see what a change had come over those beautiful teeth ; every tooth had the surface of an oyster shell ; the lady had used a great deal of bromides of potassium. I polished her teeth as perfectly as I could, and left deep grooves in the incisors. It is now eight years, and her teeth are still as beautifully polished as on the day they were polished ; no de-

cay about them. I attribute the change in the teeth to the action of bromides of potassium.

Dr. SEARLE: The tincture of muriate of iron is often given, and I have seen beautiful polished teeth in six months become rugged, and it is possible that there are other medicines which have similar effects on the teeth.

Dr. PARKER: The last remark suggested an experience in my own mouth. I was troubled with very severe sore throat, and my physician gave me a gargle; one ingredient was muriatic acid and, after using it some time, I observed that my teeth were quite dark; I got my brush and gave them a thorough brushing; they were not smooth, but rough and chalky. I did nothing further but polish with pumice stone and brushes, and I suffered nothing afterwards.

Prof. MAYR: About the reference of Dr. Atkinson to bromides and working men in bromine factories, is there not somewhere a mistake? The very identical symptoms were described, and the notice about it I saw in many papers, but the producing agent was not bromide of potassium, but bichromate of potassium; where is the mistake? I am quite sure that the special symptom of perforation of the septum was ascribed to bichromate of potassium. Another point mentioned by Dr. Parker, I think, is that the teeth, after the action of acid, present a chalky appearance. Now, chalk is carbonate of lime; therefore, a chalky appearance would mean an appearance of carbonate of lime; this is not very well possible, since the acid would have taken out the lime; if the acid takes out the lime-salts, the tooth will have not a chalky but a gristly appearance; but if something else has been taken out, the appearance of the lime-salts may be *chalky*.

Dr. NILES: In typhoid fever you will know we have increased temperature; the great mucous membrane of the mouth becomes very dry. Magitot observed increased acidity of the saliva from the fermentation of the mucus by the rise of the temperature; the acids are lactic and acetic acids, both of which dissolve the teeth. This young man spoken of by Dr. Shepard in his paper went through a severe disease; he was taken sick in summer; when the system has obtained vigor, he shows still the consequences. This reminds me of a lady who had a great many children, and, while carrying a child, her system was subject to a great drain of lime-salts; her teeth had this appearance: Chalky in some places; in others, where the salts were more dissolved out, they could be cut with an instrument; she recovered after the delivery of the child; the places of decay have returned to their hard

condition, although discolored in some places. I believe the teeth are in better condition from the use of alkaline washes to neutralize acids; I have not ground out anything. These alkaline washes are in perfect conformity with the best authorities of the time. As to the use of tannic acid, I wish to say that I consider it as fuel to the fire; it has an action upon tooth substance; if you put a tooth in a solution of one per cent. and leave it there for three months, it is decalcified.

Dr. SHEPARD: I would like to ask Dr. Niles where the lime-salts come to recalcify the surface.

Dr. NILES: There is plenty of opportunity to recalcify; at the age of the boy the tooth was not yet perfectly calcified; a good deal of calcification is still going on. How old was he?

Dr. SHEPARD: Seventeen years.

Dr. NILES: What good came from the use of tannic acid?

Dr. SHEPARD: I stated that I doubted if any came, but I think it is a different thing, using a solution of tannic acid and putting a tooth into a strong solution.

EVENING SESSION.

This session was devoted to Section No. 1, Dr. S. E. Davenport, chairman.

Papers were read by Drs. Ross and Davenport—found elsewhere in this number of the Journal.

Discussion:

Dr. ANDREWS: My own work has been in the line of investigation of the development of teeth. I have specimens which show the development from the enamel organ to the full tooth.

Dr. NILES: I should like to inquire what the advance was which Dr. Bödecker has made in bringing out the organism of the nervous mechanism in teeth.

Dr. DAVENPORT: I should say that the greatest advance made by Dr. Bödecker in regard to the organized structure of the tooth has been the connection of the dental fibrils by means of fine offshoots from the periphery of the dentine and the formation through their anastomoses of a reticulum in the substance between the canaliculi or the base-substance; he showed the living matter in the enamel and the net-work connecting it. I do not think that he claims that these fibres are nerve filaments or even are the extension of nerve filaments. He claims simply that they are in connection with the nerve of the

pulp and are capable of conveying sensation, perhaps as well as if they were nerve fibres.

Dr. NILES: He claims that they receive with chloride of gold the same color as nerve fibres, and are stained in the same manner.

Dr. ATKINSON: It is asked what has this man done that is in advance of what has been known before. Probably this question cannot be replied to by any living man. Since 1856 I have been interested in the work, and have taken every opportunity to work from my stand what I could. I love the man as my own blood who is engaged in this work; I think it is a very holy fire that stimulates such persistence. My understanding is that it is the principle of interpretation that makes the differences. Although the things have been seen without interpretation by faithfully working men, they were not able to interpret what they saw. I have reference to the reticulate structure of the tooth substance: enamel, cementum, dentine, etc. Baccate fibres have been observed long ago and been attributed to the enamel; later discovery proved that the baccation was the transverse lines of the living fibres. It was Carl Heitzmann who discovered that the protoplasm was organized tissue and not homogeneous. With this we have struck ground where we can speak lovingly of the differences. There is one serious mistake of correct understanding in what Carl Heitzmann says, and one of the differences between him and me. If you listened closely, you will observe that Dr. Davenport said that Nasmyth's membrane which covered the enamel of the erupted tooth was connected with the epithelium of the gums; that is what the drawings of Dr. Carl Heitzmann show, but what nature never did show, never could show, never can show till the Divine Architect shall have changed the place of the development of the tooth. If I had time, I would make a drawing and show you the difference. I say it positively but lovingly that I may know a thing myself, but not know it for others. He who has learned sufficient of mental action to criticise the operations of his own mind through the increment of illumination, can criticise his own method with all the scaling severity of others. In the same manner, when we say two, we do not think the same sort of combination of units, and if we do not agree afterwards it is the misinterpretation of the individual. Dr. Heitzmann said in a modest manner at the time of the discovery of the structure of the cementum and dentine, that he was not ready to say they were nerve fibres, but they were a continuation of distinctly medullated fibers and came out as protoplasma-strings. I appeal to

all if that was not a justification of the illumination twenty-five years ago, that all embryonic tissue was a mass of what Heitzmann says is the living matter that does the movements of contraction and reflexion. Owen's Odontography gives a figure of the human tooth taken from the fœtus. The drawing shows the protoplasma fibres and the reticulated structure more than twenty-five years ago. They were called Max Schultze's forms, because he had seen them in certain conditions.—Nasmyth's membrane is the connective tissue-covering of the entire pulp of the tooth, and it is the last remnant of the membrana preformativa or enamel cap. It is outside the enamel cap, it goes down, and it is the base from which the cementum corpuscles have been evolved; it is the envelope of the completed tooth. Nasmyth's membrane is a sac perfectly closed upon the apex of the tooth.

Dr. Davenport: I remember that Nasmyth's membrane in a specimen was really a very thin layer of cementum; they told us it was similar in construction. In the case of the bicuspids, there can be shown corpuscles similar to those in cementum proper.

Dr. Atkinson: I have seen this. It is the basis from which the cementum comes; it is the embryonal state of the cementum. It is to the tooth what the amnotic membrane is to the fœtus.

Dr. Davenport: The corpuscles of the membrane should be identical with those of the cementum, and not at all like those of epithelium.

Dr. Atkinson: They are not! Then why should a histologist of Prof. Heitzmann's standing interpret epithelial corpuscles as bone corpuscles?

Dr. Davenport: To me the membrane looked very similar to the margin of the gum as seen in the specimen.

Dr. Andrews: Nasmyth's membrane is the substance that forms a sheet over the enamel which it is almost impossible to destroy by the action of acids. It is the continuation of the organ which forms the cementum over the dentine; it is about $\frac{1}{20000}$ of an inch in thickness. When you pull it off the tooth it is full of holes; it looks like epithelial cells. It is under the most searching experiments a continuation of the cementum layer, because the corpuscles that are found in the deeper portion of it are found in the fissures. The corpuscles have been formed identical with the lacunæ in the dentine. Dr. Tomes says in his anatomy that he has seen specimens where there is no doubt about the fibrils between the enamel rods; he has demonstrated it to his own satisfaction. We have the three germinal layers; epiblast,

mesoblast and hypoblast; the first two are all you see in the embryo; it is what has been called cellular tissue but what we now call epithelial tissue; the innermost layer is columnar layer of the stratum Malpighii, and the connective tissue is below. If a tooth is to be formed, we find a ridge of epithelial tissue forming the dental groove; this grows longer and widens; the cells which multiply within the enamel organ are unlike the cells which we find in the epithelium. They are smaller, and appear entirely different. At this stage all is epithelial and possibly reticular; the ridge grows deeper and deeper, and finally parts from the upper layer of epithelium, and the dental cyst is formed from which the tooth afterwards originates.

(Three beautiful specimens of a tooth of a fœtus of a pig are shown, plainly showing this course of development.)

SECOND DAY—FRIDAY, JUNE 29, 1882.

Morning Session.

President Fones in the chair.

A report of Dr. Parmele from Section 4, on Surgical and Operative Dentistry, etc., is read; it was to the effect that his section had nothing to report.

Dr. Lovejoy gave a report of two remarkable cases of teeth in the trachea.*

Dr. Shepard: On this subject I should wish to speak on the subject of separation of teeth for filling, and I would remark first, that the paucity of directions in the text-books is striking. Even Coleman in the new book has not very much. The text-books should have certain minute instructions as well as generalizations. I shall confine myself to slow wedging. I would like to say what I consider an *essential* for a material for separating teeth, and what I consider a *non-essential or desirable*. As essential, I consider:

First, Non-elastic or very slightly expanding substances should be used.

Second, They should have sufficient firmness of texture so as to prevent the play of the teeth and alternate movements.

Third, The space after obtaining it should be held firmly; the only movement should be one of separation.

Fourth, The increase of space should not be constant, but should have periods of movement and rest.

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*The report will appear among our selections in a later number.

Fifth, The period of rest should be long enough—three to four days—to allow the teeth to recover from the soreness in the sockets, so that they can be operated on with as little pain as though they had not been moved.

Sixth, The substance should never press or touch the gums between the teeth.

Desirable: First, To devise a system of general adaptability combining the above essentials.

Second, To make such a system so simple to understand and easy to apply, that the patient can perform the service intelligently.

Third, To find a substance, agreeable to the patient in all respects possible.

These are my propositions or axioms. In examining them and the materials under this heading, I would remark that most materials, commonly used do not conform to these requirements, and the extracts from the books show that what they record does not conform with it. One of the materials that conform least is elastic rubber. I do not know to what extent rubber is and has been used in the years past by the majority of practitioners, but it is one of the materials which answer fewest of the essentials. It is elastic, has not sufficient body and firmness to prevent play; it does not answer to the third requirement that the space should be held firmly; there is no period of rest; it works constantly; if periods of rest are there they are only very short; the substance presses against the gums, etc. I go from the worst to the best. This is *tape* so saturated or charged with some substance as to render it of firmer texture, smoother on the surface and lubricated, a non-absorbent of odor or fluids, and so saturated with a material that putrefaction is arrested. The system is to some extent original, and I have worked it for three years and now present for the first time to the public. Plenty of other gentlemen have been using the tape, and it has been used at haphazard, but not by a system with such rules that you can give the patients a copy and let them come back with the teeth separated and free from soreness. (The little contrivance is here shown; it is a little box with a crutch rivetted on to keep the tape under the liquid, and at the end is an iron which strips the tape from an excess of liquid; the tape comes out beautifully smooth; it is simply hung on a piece of wood to cool and then wound up on a piece of board; the box contains nothing but wax. It can be put on the top of a vulcanizer when used). I use wax with a little glyzerol or thymol, on some tape with one per

cent., on others two per cent. Formerly the only way to wax the tape was to get it on a board and to rub the wax into it; I never have heard of other method of preparing tape. Now the system which I give for my patients includes several things: First, the initial force should be very slight; the second point is that the force should be gradually increased and the tape changed only once in twenty-four hours, to give a period of movement and a period of rest; the third rule is that the motion of going back should be arrested. Get what you can, keep what you got! The material should be left in until subsidence of soreness and recovery to such normal conditions that pressure and percussion should not produce pain. No portion of a tooth should be removed except for the best of the tooth itself; all space for working in difficultly accessible places should be obtained by moving the teeth and not by filing, unless this is done for the good of the tooth itself. My patients understand easily the use of this method. Another fact with my patients is, that the dread of separation of the teeth is a thing of the past. One thickness of the tape will go between any teeth unless there are sharp angles so as to cut it. You should not carry the tape too far up, but so that the pressure leaves a small width of tape above the point of nearest approach and below it. There is one other material I use besides tape, and this I do in the most trying cases under peculiar circumstances—in the case of teeth that touch close to the gums; it is vulcanized rubber. I make wedges and file them so that they will stay between the teeth; they are non-absorbent and remain perfectly sweet. I present these ideas to stimulate investigation in this line, and I intend to have the rules printed on a slip of paper and to give it to my patients.

Dr. Morgan: White celluloid of piano keys is excellent for these wedges; it is smoother and finer than anything else.

Dr. Shepard: Several manufacturers have put into the market special wedge cutters. I do not see the necessity of any.

Dr. Cutting: How would you hold the tape between the teeth and prevent it from going up to the gums where the teeth touch on the edges?

Dr. Shepard: That may be one of the cases where you have to make something of hard material, which your patients will take out during dinner and put back again afterward.

Dr. Morgan: Fold the tape so that it will leave a seam inside which will work like a wedge and keep it from going up.

Dr. Bliven: I have used Dr. Shepard's method something like

five years, suggested by a patient who used it. She took a small piece of tape from the basket and pressed it between the teeth. I began to use and saturate it; I rubbed it on a board with wax, incorporating it thus; but that was not satisfactory, and I began passing it through hot melted wax, but I did not think that this was very good, and so I put it through a mixture of gutta-percha and wax, pressed it, and placed it on a board with paper over it, and put a hot flat-iron on it. I think that this will saturate more than any other method; it is a very quick and easy method.

Dr. Morgan: In regard to tape, I do not know where I got the idea. I have used for several years cotton cloth—strips torn from the common cloth. I tear off strips and put them between the teeth. I was very much pleased with the method.

Dr. Noble: I think the use of tape is very valuable; I used it since 1853, but I never coated it this way. I think it would be a valuable addition to our supply. You know where you are with mathematical certainty.

Dr. Coolidge: I wish to give a suggestion in regard to the use of tape. I have found its use difficult where the teeth are slightly decayed. I made for myself a little spatula-blade one-half or one inch long, exceedingly thin—gradually tapering at the point—as thin as possible. Take the closest approximation between teeth you can find, and you can press the spatula between, and by giving lateral motion, there are very few cases between the bicuspids and molars where in a few minutes you cannot pass rubber or ligatures through. These spatulæ are made by Codman & Shurtleff.

Dr. Shepard: I would like to say a little personal remark in this connection. I spoke of one or two points as being original. The secret of the process seems to me to lie in a systematizing and formulating the methods, and this is what I did.

Dr. Noble: I will tell you what I once had in mind, but what I never did carry out. It is what may be called a dental catechism; for many patients it would be an advantage; they would remember better what is said to them.

Dr. Atkinson: I would like to make a few remarks in regard to the success. I had the opinion about the meeting at Greenfield last year that it was the finest we ever had, as far as sociability and scientific attainments are concerned, but I am a little puzzled, for I think that this meeting has transcended the meeting at Greenfield, and we have had one of those meetings that tend to bind the hearts together in a

manner that adds to our strength in studying the intellectual problems that require more affection and interest to know the depth of science. The social element is really at the foundation of all improvements; however well we may work alone, it takes a long time to accomplish anything that benefits the world. We had the opportunity of visiting a place renowned for learning. It is a wonder to me how Dr. Vincent could crowd so much enjoyment and instruction in the time set apart for our visit. I want to move a hearty vote of thanks of this body to Dr. Vincent.

Dr. VINCENT: I think it is all out of the question; I have hardly tried to do anything.

Prof. MAYR: About three years ago, when I became first interested in dental questions, I was invited to attend a meeting of the Connecticut Valley Dental Association at Springfield. They told me that there will be Dr. Atkinson, a queer chap, with lots of Greek about himself. I was highly curious to make the acquaintance of the gentleman; I then thought him a trifle eccentric, but in possession of an immense amount of learning and a wealth of language that put me into difficulty, though I had experienced a fine drilling in Greek; during the last two years I have marked a decided change. Slowly Dr. Atkinson's ideas, like retrograde metamorphosis of tissues, his lectures about the structure of teeth, the value of direct observation, the worthlessness of relying more on text-books than observation, etc., are beginning to be understood, and we are in the happy danger to become as "queer" as Atkinson. I think that a very large percentage of the success in many of your meetings is and remains due to Dr. W. H. Atkinson.

Close of meeting.

THE CONNECTICUT VALLEY DENTAL SOCIETY.

The nineteenth annual meeting will occur Thursday and Friday, October 26 and 27, at the Massasoit House, Springfield, Mass. The first session will convene at 11 A. M., Thursday. The accommodations at this house are excellent, and the rates will be $2.50 and $3.00 per day. The reports from the Section Committees are, already, such as to warrant the promise of a most excellent meeting. Prominent gentlemen from New York, and elsewhere, have been invited, and are expected to be present. All dentists invited.

Per order of Executive Committee.

A. M. ROSS, *Secretary*, Chicopee, Mass.

EDITORIAL.

Dr. George Watt, after a venomous editorial—and after being a chemist of *forty* years' experience—plays the boy who, when his turn comes, "won't more play." We are sorry to think that Dr. Watt compares us with the journeyman and himself with the boy who was touched with the boot toe of the first one at his trowsers and afterwards said: "If I had known this, I wouldn't have learned the trade." We do not think that we were as uncivil as that, even in a figurative sense; but if we were, we will try no longer to be the journeyman, but the polite gentleman who treats a boy civilly, and even if he had only some forty years of chemical experience. We never raised the question of knowing any more about chemistry than a dentist. We know they all are too good chemists to compete with, they all have time, to spend from eight to ten hours daily in a chemical laboratory; we know they all have their analytical scales finely adjusted and have nothing to do but to investigate chemistry; we know that too well to claim that we, as a chemist, whose only business those things are, could know more than a dentist; but by a mere impulse of impudence we stepped among them like an innocent lamb among the wolves and, strange to say, we were never yet ejected for ignorance. But, we cannot be ironical; we have to try the plain fact style; we do not know to drop into the chemico-dental poetry of Dr. Watt, which flows like a train of cog-wheels of *forty* years' experience without greasing.—If a man has to write a good deal, he will write now and then a weak passage; not one man was excepted, from Moses and Plato and Paul, down to Mr. George Watt, and poor humble "Us, too." To take out such a sentence and put a misinterpretation into it, as Dr. Watt does now and then, is very easy—nothing easier—but this is not facing the point. Dr. Watt has not faced any of the *facts* mentioned in our August number, and fencing and beating about the bush with mere words, does not show very favorable for *forty* years of chemical experience. Our discussion did not touch the point of who knows more, but who is right. To misconstrue any of our words into claiming to be the only chemist among dentists, as Dr. Watt interprets them, does, to say the least, almost surpass unfairness. Every dentist with whom we have to deal will have to acknowledge that we suppose every man, without sufficient negative proof, to know as much as we do. We may be opinionated,

and stick too much to facts and to what we can prove, to suit some who practice the chemistry of words and forty *years'* experience. The question of decay seems to Dr. Watt to be settled once forever by his beautiful words about lactic, acetic acid and ammonia. Well, we do not care to rob him of a happy illusion, but we claim, at least, the right to investigate and test every word belonging to chemistry as far as it can be done. Then, Dr. Watt seems to be in another pious illusion, that the "chemistry of the oral cavity" is different from the organic and inorganic chemistry as generally known. To judge from his own results, after *forty* years' experience, we suspect it is an oral chemistry, or chemistry of words.

Dr. Watt says that "the discovery of caries as something else than an ulcer, laid the foundation of dental surgery." Now, sincerely, has the theory about caries anything to do with the excavating of a cavity and filling with gold, with extracting a painful tooth, with making proper separations, etc.? Have all the alkaline or acid washes or what supposed conditions in the supposition of Dr. Watt may require, ever prevented or cured an existing decay? If the acid and laboratory-theory has done that, we acknowledge ourselves beaten. No dentist, even if he be a chemist of forty years' experience, has ever *cured* a decay on the supposition of acids or alkali causing it. It may be that the object is not within the reach of our science at present, but we dare (!) to go ahead and not believe any man, if he has words only, without sufficient facts.

A trifle to the point, as if age had anything to do in giving a man chemical knowledge, discrimination between facts and fiction, applicability of facts to the question, etc. Modern chemistry, chiefly organic chemistry, is advancing so fast that the best man has to do all he can to keep up with the times. It was never better illustrated to us than by the fact that we almost had to regret to have received our first chemical instruction from J. v. Liebig. Liebig, the greatest chemist between 1840 and 1860, had not advanced beyond what he knew, discovered and reasoned; at the time of his death (1875), he still taught the old formulæ and theories, though already (1860) the views of Avogadro, Hofman and others threatened destruction to his views. He met them with disdain, in confidence of his superiority. Now J. v. Liebig was a master-mind; he ground out the best reasoning from the facts known to him; but even J. v. Liebig could not stop the world. Over his body the accumulation of facts and thoughts, called chemistry, advanced, and it was difficult for us

to throw off some of the shackles he fastened to us; Liebig may even have been up to the knowledge of a chemist of forty years' standing—whom Dr. Watt means I do not know, and therefore cannot offend, but he himself says to have studied and observed about that length of time. Dr. Watt himself continually cites Liebig, and by this alone shows that since 1860 he did not advance much. Many of the thoughts of Liebig are excellent; his negation of vital force laid the foundation of modern physiology; his reasoning, unbiased by theological myths, is clear, concise, and, as far as based on indisputable facts, good still to-day; but what he thought and wrote was the best *forty years ago*, and only the principles laid down by him—a reading of which Dr. Watt might find rather detrimental to his mytho-chemistry of dying and obedient molecules—have stood the test, while his detail-teaching has been superseded by better knowledge and interpretation of facts. We have met with dentists and chemists of forty years' experience who could not answer us the most simple questions, like:

What causes the hardness of teeth and why is decay soft?

Have you ever observed—not guessed!—any acetic or lactic acid in a decayed mass, decaying tooth, or in saliva, not due to their having been ingested a short time ago?

How do and did you determine and test lactic acid in a decayed mass or in the mixed fluids of the mouth, so that a chemist of less than forty years' experience may be able to do it also?

M. Piot has made experiments, under the direction of M. Laborde, to ascertain the order in which the functions of the organized tissues cease in normal asphyxia. He insists that the exact moment of death is very difficult to determine, and that we cannot fix the instant when the stoppage of the heart and of respiration is definite. The mechanical movements of inspiration first cease to become apparent; then the beating of the heart becomes less frequent, but continues; the pupils of the eyes are dilated excessively, and the cornea becomes insensible. These, however, are only apparent signs of death, for dogs, in which such phenomena have appeared, may still be brought back to life by means of artificial respiration.—*Pop. Science Monthly.*

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ORIGINAL COMMUNICATIONS.

ETIOLOGY OF DENTAL CARIES.

ACIDS OR GERMS; WHICH?

BY C. T. STOCKWELL, SPRINGFIELD, MASS.

[Read before the New England and Conn. Valley Dental Societies, October, 1882.]

During the last few months some notable papers and reports have appeared, regarding the causes of dental decay, which are eminently worthy of more than passing interest. Some of these papers are more suggestive than otherwise; while others treat the subject with quite positive assertion, being supported by a variety of experiments that seem to give a substantial basis for the assertions made. With the claims of those who hold to the "acid theory," you are too familiar to render a reiteration of the same at all necessary.

I propose in this report a simple summation of some of the investigations recently made, most of which have already been given to the public in one form or another.

In the first place I wish to quote from a very interesting paper read before the Illinois Dental Society, a little more than a year since, by

Dr. C. W. Spalding of St. Louis. He says: "In common, I believe, with many other practitioners, I have supposed that an acid condition of saliva prevails, or at least may usually be looked for in most cases of *rapid* decay of the teeth. Under this impression I entered upon a series of chemical tests with a view of endeavoring to discover the *cause* of this assumed chemical condition of saliva.

My observations have resulted in the formation of an opinion amounting almost to a conviction, that the agency heretofore ascribed to the chemical condition of saliva in promoting decay of the teeth in healthy persons, has been largely over-estimated, if it has not been altogether erroneous. My first experiments were made upon the saliva of a young girl—aged 12—whose teeth were decaying rapidly, so much so that fillings previously inserted, that is, before the case came into my hands, whether of gold or other material, had lasted but a short time, and in whose teeth *new* cavities were constantly forming, and this at so rapid a rate that cavities of considerable size would form in the space of a few months, notwithstanding pretty thorough cleanliness and good general care.

I looked to find an *acid reaction of the saliva* in this case, and had been reflecting on a course of medical treatment having in view the correction of this supposed condition of the saliva.

What, then, was my surprise on finding, after repeated tests, that the saliva of this young person exhibited in every test either a neutral or a slightly alkaline chemical reaction! In no one of a large number of tests was there any, even the smallest acid reaction shown.

I immediately sought other cases where a similar destructive process was going on, but the result in each was precisely the same as in the case just narrated.

A professional friend also made similar tests in some very marked cases of rapid decay with the same results—no acid condition of the saliva revealed. . . . .

The view I now present is, if the general health is good or fair, and the saliva normal or nearly so, any rapid decay of the teeth *must be attributed to some other cause than an acid saliva.* In certain localities favoring the lodgment and retention of food, decomposition of food substances probably takes place accompanied perhaps by the generation of an acid. But many of the cavities of the class now under consideration are located at points very unfavorable to retention, and it would not be fair to assume that decay occurring at these points was occasioned by products resulting from either the partial digestion,

the oxidation, or any other change in food substances. . . . . . . Are there any other known methods by which *acids may be generated*, to whose action this rapid decay of the teeth may be fairly attributed? Let the *chemists* answer! If yes, the methods should be sought out and explained, that the *chemical* theory, as it relates to this class of cases, may be fairly presented. If, however, the chemical theory is found, on thorough investigation, to be inadequate to the production of this class of cavities, or of any cavities under the conditions I have presented, some other cause must be invoked."

This paper of Dr. Spalding was read before the above-named Society in May, 1881, and is mainly suggestive in its nature, evincing, however, a *questioning* attitude, at least, in regard to the "acid theory."

In the following month of August a paper was read before the International Medical Congress, giving the results of "An investigation into the effects of *organisms* upon the teeth and alveolar portions of the jaw," by Arthur S. Underwood, M. R. C. S., L. D. S., and W. J. Milles, L. R. C. P., F. R. C. S., and C., that is of quite a different nature, and affords an answer to some of the queries of Dr. Spalding; how satisfactory to him, however, I do not know. This report was published in the Journal of the British Dental Association, and republished in this country by the Missouri Dental Journal, and the New England Journal of Dentistry of May, 1882.

If any gentleman present has failed to read and re-read this report I venture to most seriously urge him to secure a copy of either of these journals containing it, and, until he can *disprove* the statement of experiments and observations therein given, take down from the shelf of accepted facts the old dusty "creed" of "acid theory," and write upon it, "*re-opened for further investigation.*"

I said that this report differs from the paper from which the preceding quotations were made; that the first is suggestive and questioning. In the preface to this report, by these English scientists, they offer as the one only apology for venturing to present it before so illustrious a body, "a firm and rooted belief in the truth of our theory, and a hope, amounting to a conviction, that it will prove serviceable to humanity."

They announced as the object of their inquiry—undertaken some four years previously—"to determine, as far as possible, to what extent *germs* are present in the dental tissues when in a state of disease and to deduce conclusions as to the *effects* of their presence."

Their methods of experimentation are stated to be "three-fold." 1st, Microscopical; 2d, Flask experiments; and, 3d, Clinical experiments.

They state that "The results of this three-fold investigation have uniformly led us to the conviction that *germs* play an important part in the *production* and *maintenance* of morbid conditions of the dental tissues. . . . With regard to the purely chemical theory, we cannot accept it as wholly satisfactory, for the following reasons:

1. Because the destruction of dentine, effected by the action of acids alone, under *aseptic* conditions, does not resemble caries, either in color or in consistency, it being colorless and gellatinous, the process uniformly attacking all parts of the surface.

2. Because sections of dentine so destroyed show *uniform destruction of the matrix*, but not *enlargement* of the *channels* occupied by the *fibrils;* whereas, true caries first attacks the *soft tissue*, i. e., the *fibrils*, and encroaches from that *point d' appui* upon the surrounding calcified structure, thereby producing the characteristic enlargement of the channels, until two channels break into one, the intervening matrix being wholly destroyed.

3. That, although artificial caries have been produced exactly resembling true caries, we have failed to discover any record of an experiment in which this has been the case where septic influences were excluded. . . . .

4. We would urge that when caries occurs in the mouth, it is always under circumstances more favorable to the action of germs than to that of acids. There is always, first of all, a minute pit or haven where germs can rest undisturbed and attack the tissues. We cannot, upon the purely acid hypothesis, explain why the same acids that originally caused the decay, gaining access through some minute imperfection of the armor of enamel, do not in the same mouth, or under the same conditions, attack the wounded enamel at the edges of the filling. The germs cannot rest there, they are constantly washed away if the surface is fairly smooth; but the acids literally bathe the part except during the performance of the act of mastication, when the alkaline parotid and submaxillary saliva neutralize their action.

These considerations led us to seek for signs of the presence of organisms in carious dentine, with results that far exceeded our expectations.

This theory—which, for the sake of distinction, may be called 'septic'—is rather an amplification of the chemical theory than a contradiction of it. Most probably the work of decalcification is entirely performed by the action of acids, but these acids are, we think, *secreted by the germs themselves*, and the organic fibrils upon which the organisms feed, and in which they multiply, is the scene of the manufacture of their characteristic acids, which, in turn, decalcify the matrix, and discolor the whole mass. . . . The sections from which our observations have been made, have been cut from fresh teeth, very shortly after extraction, and without any decalcifying or softening re-agent.

We have subsequently stained them with an aniline dye—methyl violet—following as closely as possible the process recommended by Koch, a process which renders micrococci fairly distinct under a one-eighth lens, with proper illumination. . . . In dentine, which has occupied most of our attention, we have *invariably* discovered the channels containing the dentinal fibrils more or less infiltrated with germs—for the most part micrococci, oval and rod-shaped bacteria. The germs we find penetrating, at first in Indian file, then more thickly along the course of the fibrils.

As they accumulate and choke up the channels, they encroach upon the matrix, diminishing the distance between the fibrils until the matrix entirely disappears, the neighboring channels join, and the whole tissue becomes *one conglomerated mass of organisms*. Beyond the sphere of *visible* decay, sections cut from apparently healthy tissue show here and there a narrow line of micrococci or bacteria, like an advance guard, and such isolated tubes or germs probably penetrate far into tissue which the naked eye would pronounce sound.

In decay which has appeared in blocks of ivory worn on a plate, we have observed very similar appearances, also *in some caries which we have produced ourselves* in a flask, by exposing a sound tooth to *septic agencies*.

In cementum hitherto we have experienced some difficulty in obtaining sections of tissue into which caries has penetrated; but where we have succeeded, we have found the lacunæ filled with germs. In some lacunæ, the protoplasm of the osteoblast cell is slightly stained, the nucleus very deeply, and a few germs are scattered about in little groups. In others, the protoplasmic contents of the space appear to have been totally destroyed, the outline lost, and the whole lacuna crowded with germs."

A considerable portion of the report by these gentlemen is a statement of experimentation and observation relative to the action of germs upon the *pulp* of teeth, and in alveolar abscesses, for which I must refer you to the published article.

A brief summary of the report, in so far as it relates to the etiology of decay of the teeth, is as follows:

"We consider that caries is *absolutely dependent* upon the presence and prolification of organisms. That these organisms attack first the organic material, and feeding upon it, create an acid which removes the lime-salt, and that all the differences between caries and simple decalcification by acids is due to the presence and operation of germs."

Let me recall your attention, right here, to Dr. Spalding's inquiry, viz: "Are there any other known methods by which *acids may be generated*, to whose action this rapid decay of the teeth may be fairly attributed? Let the *chemists* answer."

It is also interesting to note that, while Dr. Spalding was engaged "on this side of the water," in a series of investigations which led him to substantially abandon the "acid theory," and to call upon the *chemists* for "further light," two gentlemen, at least, on the *other* side were, at the same time, engaged in a long series of scientific investigations which resulted, three months thereafter, in the promulgation of, at least, a *theoretical* answer to his question.

As far as is known to the writer, these gentlemen stand alone in the presentation of a theory that the *inorganic* portions of the teeth are destroyed by a *peculiar* acid which has its *origin* in the operations of germs upon the *organic fibrils*. I find, however, that something like this is hinted at as *possible* by Prof. Tyndall's writing on allied subjects.

The conclusion is inevitable from a careful study of this report, that if the *germs* are excluded, there can be no decay—provided, of course, they have demonstrated the truth. But we must proceed.

In October of last year, two months after the presentation of the above report to the Medical Congress, Prof. Charles Mayr, a scientific chemist of large experience and culture, presented a paper before the Connecticut Valley Dental Society, in which he incidentally alludes to some of the theories of chemical action in decay of the teeth and declares them to be *unscientific*.

This quotation being attacked by Dr. Watt, of the Ohio State Journal, as being an evidence of a lack of knowledge of the causes of dental decay on the part of Prof. Mayr, called out a reply from the

latter—Prof. Mayr—in which he says, "*I consider decay a physiological process.* . . . Decay is an *ulcer* only modified by the difference of tissue. The chief factor probably in *starting*, and more probably *maintaining* of the ulcer are *low organisms* belonging to the protists, like bacteria, leptothrix, etc. *The lime-salts are not dissolved*, or, at least, only a fraction, but are *carried away* and *comminuted mechanically*."

This conclusion of Prof. Mayr is based upon a study of chemical facts in relation to dentistry covering several years, during which a large number of experiments and chemical tests have been made, in which it was found in every case "that the lime-salts are only slightly diminished in the decayed mass compared with the healthy tissue."

Furthermore his experiments show "that the chief chemical difference between healthy and decayed dentine is at the *outside*, not at the *boundary line* of decay. . . . That the lime-salts were the same in the decayed masses as in the healthy dentine—carbonates and phosphates."

Thus it will be observed that the "chemists" *were* already at work before Dr. Spalding propounded to them his query, and that they have rather more than answered his question.

The two English chemists referred to, and Prof. Mayr substantially agree that the presence of *germs* is necessary to decay of the teeth; that the attack is first made by them upon the *organic* tissues, upon which they feed and in which they propagate to an enormous extent, and with surprising rapidity; that the *in*organic portions of the teeth are broken down as a result of their operations. They differ beyond this point. The English scientists *infer*, if I understand them correctly, that as a result of the operations of the germs, a *peculiar acid* is secreted, which dissolves the lime-salts. Prof. Mayr, in his experiments and investigations, goes one step further, and shows that there *is no deleterious acid present* in the decayed mass, *and that the lime-salts are, substantially, remaining*, except upon the outer surface, from whence they are carried away by purely mechanical means, or similar outside influences.

For some time past I have placed nearly every tooth that I have extracted in the hands of Prof. Mayr for the purpose of obtaining a chemical analysis of the decayed masses. His report, in detail, he will give you during the session. It will suffice for my purpose here to say that the lowest per cent. of lime-salts found in the decayed masses of all these teeth, was in the case of a lower six-year molar—

crown cavity—taken from the mouth of a boy about nine years of age. The tooth was very "soft," or what is commonly termed "chalky." The decayed mass had reached the pulp. A very thin slice from the *outermost surface* of this decayed mass showed, by the most careful analysis, *40 per cent. of lime-salts* present. Sections beyond the surface showed a gradually increasing amount of lime-salts until the border line of decayed and healthy tissue was reached, when the normal amount was exhibited.

These experiments and reports constitute the most interesting and useful matter that has of late been brought before our profession; and it is something that will not "down" at a mere sneer, or cold shrug of the shoulder. Here are statements of experiments and observations made by careful men of science, and conclusions drawn from, and based upon, these experiments and observations which, if true, cannot fail to *revolutionize* much of the teachings of our literature and colleges upon the subject, to say nothing of the daily practice of the profession, or that most noble part of it, which relates to *preventive* treatment.

And here again let it be said that *very much* depends upon the truth or falsity of the theories of these gentlemen as regards *preventive* treatment. If true, then the greatest portion of the common preventive treatment is *utterly useless*. Alkaline mouth washes and dentifrices, etc., based upon the *acid* theory, are *worse* than useless—in many cases they simply *add fuel to the fire*. Acid agents would serve a better purpose. Our treatment should be *antiseptic* instead of *antacid* or *antalkaline*. In real solid fact, gentlemen, how much *absolute good* has been attained by the antacid treatment? To what extent have you, individually, *prevented* decay by *soda water, chalk*, etc.? In my own practice it has utterly failed—after the most thorough use. Soda water, etc., may, very likely, have its beneficial results in some cases; but I wish to especially emphasize the point that, in view of the scientific facts of to-day, they must be used, if used successfully, with the most careful and *intelligent* discrimination. For, as will appear further on, an alkaline condition of the saliva is as productive of *a certain class* of germ development as an acid condition is of *other* classes, and both equally destructive to the organic structure of the teeth. Consequently, the importance of a correct diagnosis and an intelligent treatment.

These experiments must be proved erroneous, or be accepted, with all that an acceptance implies. Mere assertion that "they must be

unreliable" will not do. In recognizing this to be a question of sufficient importance to warrant the appropriation of $200 to be expended in endeavoring to ascertain the "cause of dental decay," the American Dental Association are to be especially commended. In so doing, however, the "highest representative dental body" confess that the "acid theory" may be, after all, open to modification.

Allowing that the germ theory of disease in general is true, and especially as it relates to dental decay, the question quite naturally arises, how is it that a tooth exists at all, being surrounded, as they doubtless are, at all times, by an innumerable swarm of these violently voracious fellows? Again I can do no better than to quote from Prof. Mayr's statement in the New England Journal of Dentistry of July, 1882. "The existence of a tooth," he says, "is the resultant between the *outer* forces working to destroy it, and the *inner* forces active in its preservation. The tooth will be destroyed if either the *outer* forces become too strong relatively to the *inner* forces, or if the *inner* forces *become too weak*." Further on in the same article he says: "About the *septical* theory and its principles there is no longer ignorance among us. We may consider the facts as settled. But why does not healthy tissue become attacked like diseased tissue? To explain the fact, we have again to go back to the simpler forms of bioplasson, to amœba. Amœba may live in water containing bacteria; but why? Simply because they eat them up; or, to express it more scientifically, the bioplasson of the bacterium becomes a part of the bioplasson of the amœba, the latter being in excess and a more stable compound. The same will happen with a tooth; *bacteria may enter healthy enamel;* their number, from the great density and the closeness of the network of the enamel, is only small at one time, and the fibrils within, being on guard, so to say, do nothing more or less than dispose of the entering bacteria, by way of *assimilation*. Thus, as long time as the fibrils prove stronger, the bacteria will not gain entrance; but let the fibrils become weakened and they will crowd in. The danger of a part of the enamel being taken away lies in the fact that the dentine, being provided with much wider canals, the bacteria may enter in much larger number, and thus overpower the fibrils of the dentine."

As an indorsement of this position of Prof. Mayr, I will make a brief quotation from a paper recently presented by Surgeon George M. Sternberg, of the United States Army, who says: "Nature has placed in the living tissues of animals a resisting power against the

encroachments of bacterial organisms invading and surrounding them, which is sufficient for ordinary emergencies. But when the *vital resistance* of the tissues is reduced, on the one hand, by wasting sickness, profuse discharges, etc., or, on the other hand, the *vital activity* of the invading parasitic organism is increased, the *balance* of *power* rests with the infinitesimal but potent micrococcus."

Prof. Tyndall, in his recent masterly work on "Putrefaction and Infection," says, in connection with some experiments that have a bearing, at least, upon this question, that "Dr. Brown Sequard draws attention to the influence of muscular exercise on cadaveric rigidity and putrefaction, showing how quickly they appear in over-driven cattle, and in animals hunted to death."

Prof. Tyndall further says that "it is known, indeed, to sportsmen that a *shot* hare will remain soft and limp for a day, while a *hunted* one becomes rigid in an hour or two."

A case is cited where two sheep which had been over-driven to reach a fair were killed by the section of the carotid arteries. Putrefaction was manifest in less than *eight hours* after death.

To understand how this fact can have any connection with our subject, it is necessary to understand the laws and processes of putrefaction. If the interpretation of fermentation, given by such men as Tyndall, Pasteur, Lister, Schultze, Schwann, Helmholtz, and others, is to be *accepted*, we then have *Magitot himself* teaching the germ theory, for he says, in his fifteenth proposition of "General Conclusions," that "the *number* and *gravity* of caries are in *direct ratio* to the activity of the *fermentations* of the mouth." He also says, elsewhere, in speaking of albumen and albuminoid substances, that "it is only by the *results* of their fermentation that these effects"—dental caries—"can be produced." The "results," he of course conceives to be deleterious acids.

I am quoting Prof. Tyndall in substance when I say that if any putrefactible substance is excluded from the air, or, *if it is exposed to air from which all* GERMINAL *matter is excluded*, for any length of time, *no putrefaction will occur*. In other words, no germs, no putrefaction; or the process of putrefaction is *germ activity*.

The numerous cases cited show that this *activity* of bacterial life is markedly affected by the state of the nervous system at the moment of death. If there is physical exhaustion, the *resistance* of the tissues is very largely reduced, so that putrefaction is established at a very early moment. Whereas, if the nervous tissue—or bioplasson—is

normal at the moment of death, there remains a sufficient amount of vitality to resist the encroachment of germs for many hours. So thoroughly is Prof. Tyndall convinced of this fact that he attributes the different action of *infusions*, made from certain varieties of game, in its power to develop germs, to the accident of death. A hare, for instance, that is stole upon and *shot* he supposes will produce an *infusion* that will require a longer time to *develop* bacterial life than one that comes to his death by the chase, or is run down.

I make these quotations from Prof. Tyndall for two reasons.

First, because it confirms and elucidates the theories or statements of the two gentlemen previously quoted; and, secondly, because it offers a possible explanation of phenomena which comes within the observation of every dentist. We all know that in cases of physical exhaustion, especially where it is of long standing, the teeth decay much more rapidly than where normal conditions exist. Granting that the theories of these gentlemen are founded on facts, we have here an explanation, namely, the ever present *germ* and bacterial life in all stages of development, and a *condition* of the tissues which renders them an easy prey to the vigilant enemy.

Another quotation from Prof. Tyndall seems to have a bearing upon the cases cited by Dr. Spalding, and the numerous cases of like character.

He says, "There can be no doubt of the fact that, for the nutrition and multiplication of *bacteria*, *acid* infusions are less suitable than *neutral* or *slightly alkaline* ones. In acid infusions exposed to common air sometimes copiously develops *Penicillium*, while it *fails* to develop *Bacteria*. It is also true that exposure for a certain time to a certain temperature may in many cases *prevent* the appearance of life in an *acid* infusion, and *fail* to prevent it in a neutral or slightly alkaline one. . . . Two Bacteria-germs of equal vital vigor dropping from the atmosphere, the one into a *neutral* or *slightly alkaline*, the other into an *acid* infusion, soon *cease* to be equal in vigor. The life of the one is *promoted*, the life of the other only *tolerated* by its environment."

To perceive the full force of this quotation one must carefully study Prof. Tyndall's long series of the most delicately manipulated experiments whereby he reaches this conclusion.

Thus we may claim the authority of one of the world's foremost scientists in favor of the statement that when the neutral or alkaline *saliva* becomes the "infusion" into which the germs of *Bacteria* gain

entrance, the development is at once active and vigorous, while if the saliva is *acid* the development of *Penicillium*, *Leptothrix*, etc., will be *equally* vigorous and destructive—the latter being more decidedly of the fungoid type.

Remembering that this same author has demonstrated beyond the possibility of questioning that the dust of the very air we breathe contains, often, more than fifty per cent. of *live organic matter*, in the form of germs, or seeds of a possible organism, that only requires the proper " soil " to produce a speedy development; remembering, also, that the fluids of the mouth, *normal* or *abnormal*, do furnish the conditions favorable to development to the one class or the other, who can doubt the probability, more than that, the *certainty*, of the presence of organisms in every mouth! It is fair to submit, as the only question, the *result* of their presence; and it is this which renders the work of these scientific gentlemen referred to as of special importance and value.

Commencing only a few weeks since to gather up the results of such investigations on this subject as were readily at hand, I have been deeply impressed by the vast amount of facts, from various sources, that have appeared within a few months. Time and space only limit the array of these facts here. I can, in consequence, give you but a tithe of what might be presented. I must, however, trespass upon your indulgence while I cite a single other observer whose testimony is most important and most worthy of confidence.

For this information I am indebted to the kindness of Dr. W. C. Barrett, of Buffalo, N. Y.

Those of you who, after attending the International Congress a year ago last August, were present at the meeting of the American Dental Society of Europe, at Wiesbaden, will remember that Dr. W. D. Miller, of Berlin, read, at that meeting, a paper that was universally considered a masterly one, in support of the *chemical* theory of caries.

Dr. Barrett states that during the following February, he received a letter from Dr. Miller in which he says that owing to investigations then in progress regarding decayed dentine, he is led to modify his views somewhat on the subject of caries. He states that he has specimens that are bored through and through, not only by micrococci and diplococcus, but by baccillus, and in some cases by leptothrix.

In April following he sends to Dr. Barrett other preparations which show the dentinal tubules to be filled with micrococci and baccilli.

Among them are specimens showing places at a depth of 1½ millimeter *below* the surface of decay where the walls of the tubuli are broken through by the masses of bacteria and micrococci. Still another of these preparations, ground from dentine *perfectly* sound and very hard, show numerous germs, called in Germany "*spross pilz*"—sprouting fungus—making their way straight into the solid dentine through the enamel, apparently across the tubuli and enamel rods. He further states that he has a specimen—an outside piece—that is bored through and through by this "pilz." This is not a solitary case; he has several preparations showing their presence.

In a letter which Dr. Barrett received only last August, Dr. Miller states that he has submitted his preparations to some of the best authorities on bacteria in Germany, and they pronounce them *unhesitatingly* micrococci.

Dr. Miller is said to have hundreds of similar preparations showing the presence of bacteria, micrococci, etc., not only in the dentinal tubuli, but in their *smallest branches* also.

Those who know something of the eminent abilities of Dr. Miller, not only as a dentist, but as a chemist and microscopist as well, will regard the agreement of the results of his investigations with that of the English gentlemen referred to as of no little importance. The statement of Prof. Mayr, also, regarding the possibility of bacteria entering "healthy enamel" seems, in the light of these investigations, to be less visionary than many may have supposed.

I have thus endeavored, as briefly as possible, to *collate* some of the facts and statements, of recent origin, relating to this branch of the subject, believing that the question merits a candid and unbiased hearing on the part of the profession; and, encouraged by the hope that with the rapidly increasing facilities, as regards instruments, apparatus, etc., together with the advancement of such collateral knowledge as may aid them, our scientific men may soon be able to demonstrate beyond the possibility of doubt the truth or falsity of whatever pertains thereto. Our attention in the past, has been directed too exclusively to simply the *inorganic* portions of the teeth. It has been the *decalcification* of the teeth, the *non vital lime-salts*, etc., that has absorbed our attention to the exclusion of a proper conception of the vastly more important part that *protoplasm* plays in the life and existence of these organs; and if in addition to our studies of the *lime-salts*, we endeavor to know exactly the relations of *protoplasm* to the entire structure of the teeth, we may more clearly understand not

only their physiology, but the causes that lead to their destruction as well.

The inferences from the foregoing may be very briefly summed up as follows :

1. The usual custom of testing for acids in the mouth by litmus paper is, to say the least, unreliable. Reaction upon litmus paper may show simply the presence of *harmless carbonic* acid in the saliva, when a careful chemical analysis may *fail* to show the presence of those acids that are capable of even *abrading* the teeth.

2. The observations of the several microscopists cited agree in showing that in true caries the *organic* portions of the teeth, or protoplasmic fibrils, are first attacked by *various organisms*, and that their presence in the tubules, and their branches, is in advance of visible decay, thus destroying the *structure*, as the first step in the progress of caries.

3. Chemical experiments show an *absence* of acids, and compounds of acids with lime-salts, except phosphates and carbonates, in the decayed masses, and that the lime-salts are *present* in substantial, normal proportions, excepting upon the *outer surface*, from whence they have been washed away, or removed by mechanical or other outside influences. Hence, no *solution*, relatively, of lime-salt. That when the teeth are acted upon by acids, an *abrasion*, simply, is the result. Acids acting upon a tooth produce *combinations* of lime-salts that are *neutral*, or *inactive* in tooth destruction. For instances, acetic acid applied to a tooth produces as the first result *acetate of lime*, a perfectly harmless or neutral agent.

4. The most potent remedy, or preventive treatment, is that which results the most effectively in the conservation and strengthening of the "vital forces" of the system. Topical remedies, to be most beneficial, should be antiseptic.

5. The latest investigations in the three-fold field of histology, microscopy and chemistry point, with surprising harmony, to the *germ* theory as the most reasonable cause of dental caries. It explains more satisfactorily, and best harmonizes with, the observations of phenomena of daily practice. It makes intelligible nature's observed resistant processes, such, for instance, as Magitot's "zone of resistance." Lime-salt being much more easily soluble by the action of certain acids than the *organic* structure, it would seem a great blunder on the part of nature to fill up the tubuli with this material *if* acids were the attacking enemy. Whereas, granting the claim that *germs*

constitute the attacking forces, and that the protoplasmic fibrils are the points of attack, then nature seems to be "sound-minded" in barricading with mineral substances the entrance to the tubuli.

6. The same inference may be applied with equal force to the relative ease with which "soft" teeth are attacked as compared with "hard" teeth. If the acid theory is true, "hard" teeth should succumb as readily as the "softer" structure—in fact, more readily. Whereas, if we accept the *germ* theory, the unvarying opposite phenomenon is explainable. The vitality of a tooth is in its *organic* structure—not in its *lime-salts*—and if the vital conditions are unequal to the task of *building* solidly and strongly, the *defensive* quality of the structure is correspondingly weak, and yields to a much less vigorous attack of the common enemy.

A PLEA FOR INDIVIDUAL INVESTIGATION.

BY WILL H. JOHNSTON, BROOKLYN, N. Y.

[Read before the Brooklyn Dental Society.]

Thought is the great power that, working silently through all the years, has brought to pass at last that state of wide-spread intelligence of which we proudly boast—the civilization of the nineteenth century. The world honors more and more the man who thinks; the man who, through trial and perseverance, weaves his own crown of laurel and modestly wears it, holds higher place in the great universal heart than he who born to the purple, lives for himself alone and, dying, leaves the world no better than he found it.

Humboldt and Goethe and Luther are names that mean more to us than the greatest emperor that Germany ever had. England will base her claim to honor among nations, as being the birth-place of Bacon, Shakespere and Newton, long after the last of her kings shall have been forgotten. Vanderbilt and Gould and the Bonanza Kings occupy large space in the eye of the present, but do we boast of them, or of Franklin and Morse and Emerson? It is the "almighty dollar" that we worship in the former, and, like their treasure, their honor will fade away; but, by thought, the latter have enriched the world for all time.

But why present such thoughts at such a time and in such a place? What have Humboldt and Newton and Franklin to do with us as a society of dentists? Not much, perhaps, but he whose heart is not

stirred by the mention of such great minds, has himself not begun to think. They stand forever as beacon lights, showing the reward that awaits patient and thoughtful investigation. Did Franklin, when he first started his printing office, plan out those most wonderful achievements of his life? Did Newton, when he first began to wonder why the apple fell, vow that he would not rest until he could explain to the world that wonderful force that holds all nature in its grasp? No, indeed; they saw only what others saw, but they asked why, and to many questions they found an answer. Those that remained unanswered, we know nothing about.

A great painter, being asked how he mixed his paints to produce such wonderful effects, replied, "I mix them with brains, sir." Brains are not the gift to a few only; the trouble may be, they are so common we forget to use them. Investigation, as I understand it, is at the beginning simply thought upon the things that are daily presented to us. I take it we all see enough in six months' practice to keep our thoughts in activity for the rest of our lives. The dentist who complains of the monotony of his profession, is going about with his eyes shut. To many of us, no doubt, the little things that are constantly presenting themselves to us seem scarcely worthy of more than a passing glance. Who of us can tell which are the *little* things? What appears to us of little moment now, may make the world our debtors. Mankind to-day owes more to Dr. Barnum than to the whole family of Astors, and yet by how little a thing was the obligation incurred. Who can tell how many generations yet to come will bless the man who first instructed our profession in the use of the rubber dam?

The first thought that somewhat paralyzes effort by our young men, is that so much has been accomplished, little remains to done. This is the very thought that if we will but dwell upon, will stimulate us to greater activity. Others having accomplished so much, it should be our pride to contribute whatever we can, by faithful study and careful observation, to the further advancement of our profession.

Another depressing thought to many of us must be the limited means at our command; and yet with little, much is oft times accomplished. I remember reading somewhere of an eminent scientist calling upon the celebrated Dr. Wollaston, and asking to see his apparatus and the laboratory from which had been published so many wonderful discoveries. The doctor took him into his study and showed him an old tea-tray upon his table, in which were a few watch

glasses, test papers, a balance and blow-pipe. "This," said the doctor, "is all the laboratory I have." What a lesson is here presented to the thoughtful mind, and what a world of encouragement it may be to us. The mind that is disposed to work, will find means for the accomplishment of its purpose.

A great spur to increased activity on the part of each one of us, would be one hour's careful thought in summing up our deficiencies. It is a much more agreeable task, may be, to complacently tabulate a sum total of our attainments and, alas! a much easier one, but the result is stagnation. We really know but little which we have not proven ourselves. When an idea is advanced by some more active brother, we should at once seek to comprehend it by applying the test.

Anatomy, studied from the best of text-books is dry, and much of it incomprehensible, hardly leaving a trace in our minds a twelvemonth beyond examination day; but, with the "*subject*" before us, and the book at our hand, we see and understand something of the wonders of that complicated piece of mechanism upon which we are called to operate. Anatomy is no longer a mere word for us, but a living reality. "Nothing is knowledge for us that we have not worked out ourselves." We are hardly entitled to an opinion upon a matter which we have not come at originally by our own efforts, or in confirmation of the researches of others. How many of us are there who can thus claim what we pretend to know?

We spend the greater part of our working hours in trying to stop the ravages of decay, and, by a mechanical process, make good that which has been destroyed. If we are asked why all this labor is necessary, we refer to "dental caries," as though it were one of the laws of nature, mysterious but unalterable, of the cause and operation of which we are compelled to admit our ignorance, or at least give an answer far from satisfactory to ourselves. What is dental caries? and what is its cause? are questions that have long been learnedly discussed, and by many authors. When we consider how impotent have been the conclusions arrived at up to the present time, we may safely conclude that we have here a broad field, demanding careful thought and investigation. It is evidently a question that some time or other will be decided by a weight of evidence derived from an accumulation of statistics, rather than from the individual efforts of one man. The subject has been examined with some degree of care by Wedl, Leber, Rottenstein, and others. The results of their in-

quiries point in one direction mainly, that is, the chemical action of acids in the mouth upon the lime-salts in the tooth tissue. The two last-named gentlemen claim, also, that the rapid increase of caries, in many cases, after the dentine is exposed, is due to the growth of various fungi in the dentinal tubuli. How many of us have ever attempted to verify or disprove these theories? In fact, how many of us *know* anything about it? These gentlemen have recommended the use of weak alkalies as a preventive of caries, a course that is plainly indicated, if their theories are correct. How many of us who accept this theory have persistently insisted upon such treatment to their patients, and have ready the statistics to prove to us that he is justified by reason in his treatment. On this question of statistics, I wish to say a few words further on, but I call attention to the fact that, without them, the opinion of one man in average practice is as good as another, and it is hard to find any two who are in all things agreed. A man's action in life is generally guided by what he actually believes, but often not by what he pretends to believe. If, then, the theory of chemical action in the mouth, as the prime cause of dental caries, has taken possession of the soul of any man, he ought to begin to pile up statistics to prove it, if he can. Whether his theory is sustained or not, matters little; but his labor cannot be lost, and it may prove a foundation on which others may build.

Thales contended that *water* was the primary form of all the products of nature, and he led the thought of his time. Anaximenes, coming after him, reasoned that as water could or appeared to be dissolved into *air*, that, therefore, air was the beginning of life. Still later on, Diogenes, of Appolonia, distinguishing between air, as it was breathed into the body, and exhaled apparently the same, argued that there must be something in the air that was the life-giving principle, which he called intelligence—the soul.

Thus one builds upon another, and the temple of truth rises in proportion to the fidelity with which each performs his task.

This question of the "cause of dental caries" is one that may be debated without result for generations, or it may be answered in our time. What can we do toward its solution? Showing the position of the profession on this subject, let me quote from one or two leading men. A gentlemen of high reputation and large practice at one time in the city of Philadelphia, wrote some time since as follows: "We are perfectly satisfied that it is the solvent properties of the acrid fluids of the buccal cavity that directly cause the destruction of

the teeth, but whether teeth which are naturally good soonest decay, or those which are naturally indifferent, we are not willing positively to decide. We cannot make up our minds whether good or bad health favors most the development of those fluids which act most rapidly upon the teeth." After citing three cases in his practice, to emphasize his profound convictions in the matter, he concludes: "These cases prove nothing so far as I can understand them, except that teeth may decay more at one time than another, whether they are naturally good or not, if the fluids change." Rather poor scratching in that chaff for a hungry chick.

A prominent practitioner in Boston, writing not long ago upon this subject, after stating his belief in the "chemical reaction theory" in the subjunctive mood, could not urge upon us the use of alkaline prophylactic treatment in stronger terms than as follows: "In my practice I have been aided very much in this way, and would strongly recommend a trial of it by others. It is a simple matter, and no harm will be done, if no good; therefore, we should give our patients and ourselves the benefit of the doubt." There is evidently room for further investigation in this line.

Another subject that may develop greater skill in the use of the microscope, as well as interest in the subject itself, is that of the growth and influence upon the teeth of bacteria, leptothrix, and organisms of that class. What do we know upon this subject that may be of value to our profession? They are, I believe, always to be found where dental caries exists, but do they have anything to do as a primary cause of decay? I must say, in spite of smiles from the majority, that I believe there will the *greatest* good come from the pursuit of this line of study. I am afraid we have been too ready to accept the theory that they are nothing, mere maggots in the carrion.

The "new departure" is full upon us, and in many parts of the country does not want for warm and enthusiastic advocates. Have we attempted to prove its theories true or false? Have we given it an hour's candid thought? Twenty years ago there was published in the Cosmos an article by Dr. J. B. Harbert, advocating the limited use of amalgams. Commenting on the same, Dr. J. D. White said: "We publish the above article because it is a fair statement of a bad practice, and we are willing that both sides of this one-sided question shall be heard. We did not believe that any one in our profession, who was familiar with the history of the writers on amalgam, could venture to stake his reputation on so doubtful a foundation."

No modest hesitation there, but nevertheless I doubt not we have all advanced some steps in the direction of the " new departure " before this. To-day it is usual to denounce in the strongest terms the willful destruction of a dental pulp, and I would stop to inquire, do we not sometimes allow ourselves to be carried along on the tide of a present popular practice, until we reach an extreme position which will hardly bear cool inspection?

In an old number of the Cosmos I saw not long since a description by Dr. Taft, of Cincinnati, of his method of treating exposed pulps with nitric acid, and preserving them alive. To this the editor objects in the following language : " Thoroughly convinced by experience that half-way measures will not answer when the dental pulp is exposed, we cannot indorse, and, on the contrary, feel impelled to protest in the most emphatic manner against the plan of treatment suggested above. Years ago, after the most carefully conducted experiments, the effort to preserve the vitality of exposed pulps was abandoned as impracticable by the vast majority of thorough operators in every part of the Union. It is quite surprising, therefore, to find some of our eminent western brethren reviving an obsolete and reprehensible mode of practice." We see here that these " carefully conducted experiments " did not extend over a sufficient length of time, or he would not have denounced Dr. Taft so hastily.

These instances, hastily gleaned in a course of reading, limited and unsatisfactory to a painful degree, could be easily extended beyond the limit of my time or your patience.

What are some of the lessons we may learn from them if we will? The most important, I think, and the only one which I shall consider at this time, is the great advantage that would accrue to our profession from a long and constantly accumulating series of statistics. Take, for instance, the question first mentioned—the cause of dental caries. It is a great pathological problem of which at present we have but one or two ideas. It is one that necessarily demands accurate statistics before any satisfactory deductions may be drawn. There are twelve thousand dentists in this broad land. If only one in ten could be induced to examine with some care every mouth that comes under his observation, and with equal care note down its general condition, the reaction of fluids there found, together with pathological conditions more or less uncommon, who can estimate the value of a year's united effort?

There are, say, fifty members of this Society. Suppose each one of

us could be so fired with zeal for experiment and investigation as to gladly contribute the labor necessary to the carrying out of such a plan, how long, think you, it would be before the Brooklyn Dental Society would be quoted as a source of information by all inquiring men? Such a plan requires some effort and some thought, but at the end of a few months, even, I think we would cease to hear our members remark that "we were too near New York to have interesting meetings of our own."

There is another argument in favor of society action. Solitary labor is to the most of us burdensome in the extreme, but of all the incentives to continued effort, the assured sympathy of brethren and friends is one of the strongest. Under its encouragement such thought and care as I have suggested would soon become one of the pleasures of our daily life.

There are many other subjects upon which a systematic collection of statistics would shed much light. It is usual at this time, I believe, to cry down all that practice which looks to the destruction of the dental pulp (including root fillings), and I have heard some contend, if the pulp were destroyed half-way up the root, that which still retained life should be preserved. Somehow, I feel that oftentimes men, under the excitement of argument, and a desire to sustain a theory, talk a little more wildly than they would if we could show what had really been the practice of our members, and what their relative degree of success for the past year. And who would be able to resist the deduction drawn from ten years of such a record among us?

Now and again the question comes up, "What shall we do with the money in our treasury?" I believe the largest dividends may be realized by the investment of a small sum each year for the encouragement of investigation and the collection of statistics. Blanks could be prepared by the secretary or by a committee appointed for the purpose, arranged for reports upon such lines of investigation as the members might desire. Such a blank, prepared by a brother well acquainted with the latest thought advanced in each line, might prove a great help in directing in the proper channel the observations of our younger members.

A secondary result of great value, arising from such a course, would be, in my opinion, the familiarizing ourselves with a habit of close observation of all things, and a readiness in description, which is a rare quality indeed, except as developed by just such a course of

study. Huxley, in speaking of the necessity of careful observation and clear description in scientific studies, calls attention to the difficulty one would have in trying to give an idea of so simple a thing as a rose or the plainest weed to one who had never seen such a thing. To develop this power in most of us needs only an earnest endeavor to understand what we see and a modest desire to impart to others what little scraps of truth we may have accumulated from time to time.

May we all strive more and more toward that perfection in little things, that the sum total of our lives may at the end be pronounced *good.*

REMARKS OF DR. W. C. BARRETT UPON DENTAL LITERATURE, BEFORE THE NEW ENGLAND DENTAL SOCIETY. BOSTON, OCT. 6, 1882.

I am asked to say something about the staff upon which our profession leans. Without a literature, men are barbarians. Without a literature, dentistry degenerates into mere handicrafture. Before the day in which Cadmus invented letters, Greece was the home of petty tribes of savages. What distinguished and made forever memorable that early Egyptian people, with their wondrous civilization, but the fact that they, of all their contemporaries, had a written language—aye—three written languages? What marked the golden days of Pericles, of Solon, of Socrates, of Thucydides, but the high tide of literature? What were the palmy days of Rome but those of Virgil, and Pliny, and Cicero, and Horace? Where were the fame of Agamemnon, and Achilles, and Ajax, and Nestor, but for the fact that Homer lived? And to come down to more modern times, what were the golden days of England but those of Bacon, and Addison, and Milton, and Shakespeare? Nay, to strike yet nearer home, what names have thrown greater luster upon American history than those of her literary men; her Longfellows, and Irvings, and Hawthornes, and Whittiers, who shall be known when her warriors, the successful murderers of their fellow-men, shall have sunk into oblivion?

Dentistry has made wonderful progress in the past, because we have had a class of writers who, knowing what they desired to say, had the happy faculty of expressing it tersely, impressively. The pen of Harris was more powerful than his probe or excavator. McQuillen made a deeper impression upon the minds of his fellow dentists than he did upon his patients. Why need I go on to mention Bond, Taft,

Arthur and others? The sum of the whole matter is, we get a clear picture of dentistry by looking in the mirror of its literature. Every feature is reflected therein, and when our letters are at a low ebb, we may be sure the profession is not above the same level. I will not extenuate, nor set down aught in malice. We have a few pretty fair text-books, but not half as many as we should have. If one desires to write up any subject in dentistry, when he looks about him for his authorities and quotations he is quickly reminded of a want which cries aloud. We have a fine array of dental journals, and they are a fair representation of the profession, but with two exceptions, possibly three, they are owned and practically controlled by the mercantile interest in dentistry, and are mainly published as advertising mediums.

The part of each which is devoted to the profession is not what it would be if dentists were more communicative, but it is pretty well as compared with other professions. Our journals are in the main not very deep, but they are broad. It is a shame to us of the rank and file that so many articles are necessarily admitted as padding—to fill up. There is a great deal of borrowing from each other, and not enough of original essays and primary thought. How can there be, when dentists are so backward in preparing articles—and when the journals pay nothing for the better class of writers, and must therefore put up with what they can get? There is a deal of red rubber and amalgam talk, and not enough of basal principles, but the journals are struggling toward higher ground. The old seniors, like the Register, the American Journal, and the Cosmos, hold their own fairly well among the younger ones, though the indications in the juniors of young blood, later investigation, and fresh thought, it may be plainly seen, nettle the old ones at times. Altogether we have no reason to blush very deeply for our literature. It would be better if there were less of dental depot influence (I do not intimate dictation), for the light is not becoming more manifest when, practically, the depots openly combine against the dentists, and not a journal raises the voice of warning, but in the main our periodicals are as unshackled as, in the nature of things, they well can be.

What is the outlook for the future? That depends upon the progress of the profession. If dentists are thinking, reflecting men, our muses will show it. If the profession is everywhere given up to the "auri sacra fames," the cursed thirst for gold, we shall soon have cause to hang our heads for our humanities, because the stream cannot rise higher than its source, and professional literature will remain

at the level of the body with which it is connected. It must be remembered that every profession makes its own literature. Editors write few of the articles which they publish. Look through the list of our journals, and see what proportion is conducted by practical, working dentists. The busy bees of the profession have little time for composing homilies upon the flowers which they are engaged in rifling of their honey. But if practical dentists neglect the journals altogether, we shall soon see them what some of the more prominent foreign dental periodicals are to-day—filled up with accounts of the success of the dentists in crowding themselves into medicine, and exhibiting their inability to stand alone; with long narratives of legal squabbles; the platitudes of mutual admiration societies; of meetings where a paragraph suffices to record all the scientific discussions, while pages are devoted to an account of the dinner; ten lines dedicated to the brain, ten pages to the stomach. I like good eating and drinking, but my God is *not* my belly, however much appearances may be against me.

The Literature of Dentistry, let me repeat, can only reflect the status of the profession. If dentists are wholly given up to greed and money-making, the journals will be devoted to advertising. Hah! I almost wish I had not said that, for it reminds me that I counted the pages of the last dental journal received before leaving home, and —let me say it in a whisper—there was more space devoted to advertising than to dental literature. It was a depot journal, however. I will say for the credit of the only dental journal which New England possesses, that I did the same for its September number, and found the reading matter was more than four times the advertisements; so I conclude that is not mainly published as an advertising sheet. Well, advertisements are legitimate enough, but I don't like to see our very altars inscribed—"Try Dr. Quack's new patent, improved, non-shrinkable, Stannous gold, New Departure alloy; in proportion as teeth need saving, amalgam is the only material proper to save them, and mine is the single, solitary, genuine, Simon-pure, Old Original Jacob Townsend, take-no-other-only-four-dollars-an-ounce article." Such literature as that, whether in book or journals, private conversation or dental society discussions, is scarcely creditable to the profession, and those who last summer attended the International Medical Congress in London had it frequently thrown in their teeth.

The only way to sustain a creditable literature is for every intelligent dentist to contribute his mite. There is not a practitioner

worthy the name, who has not stored in his memory some aphorism that others need to be reminded of; whose experience, in some one instance peculiar to himself and unique, should not illumine and instruct his brethren. There are a few gifted men who might perhaps contribute volumes. Not one of us but could enrich our literature with a paragraph, at least. A thought which may occur to us, if properly recorded, if garnered in the grand storehouse of letters, may feed some hungry soul, and stimulate a fainting mind to renewed exertion. Neglected, it is as the idle wind which fanned the brow of yesterday, and to-day is not. Brethren, don't forget the dental journals.

PORCELAIN AND METAL "CAPS," "STOPPERS," ETC., AS EMPLOYED IN THE CASE OF DECAYED TEETH.

BY GEORGE H. PERINE, D. D. S., NEW YORK.

In the September number of the *New England Journal of Dentistry*, editorial reference was made to the inquiry of a correspondent concerning the subject indicated by the title of this paper. This method having come within my own practice, and because it has fallen to me to possess certain special information concerning it, I very gladly make the attempt to furnish the correspondent of the New England Journal of Dentistry the information desired.

In 1862, Dr. B. Wood suggested to the late Dr. S. S. White an idea of his own in this direction, which, so far as I have ever known, takes precedence of all other in point of time, so far as it concerns *porcelain* or other non-metallic substances employed as "caps." His idea was to make caps and crowns of tooth-body material, of different shades, applying them by means of grooves and slots, or by platinum pins baked in. These "caps" and "crowns" were to be grafted on the remains of a tooth by means of a plastic filling, thus restoring the form and beauty of decayed teeth. The conception was not adopted at the time, but since then it has to some extent come into general practice, and manufacturers are supplying "caps" and crowns of this character to those who desire them.

In 1875, Dr. J. Porter Michaels, then of Vienna, Austria, now of Paris, France, assigned to me for the United States certain inventions of his own relating to dentistry, among which was a process for filling teeth, for which, on July 24, 1875, I filed a caveat in the United States Patent Office. The nature of this method I made public in one of the dental journals in 1876; and, for the benefit of those who are

not familiar with it, and because it is in the line of the question I am endeavoring to answer; and, morever, that Dr. Michaels may be awarded the credit that is justly due him for the invention—I will briefly recapitulate the details of this mode of practice—the cuts which I furnish clearly illustrating the whole subject.

It will be understood, in the beginning, that while this plan is designed to do away with the trouble and annoyance of the ordinary building-up plan, the operator should nevertheless see that no point in the proper preparation of the tooth for filling is in any way slighted.

This method is used in connection with a plastic, non-conducting material, applied in the usual manner, and with proper care. The plastic filling is now to be protected by the use of a perfectly fitted "cap" of gold plate, pearl or porcelain. To explain the application of this "cap," I will remark that, in preparing the tooth for filling, an instrument should be used sufficiently large to reach the healthy part of the tooth surrounding the cavity to be filled; with the instrument (Fig. 1), a perfectly circular cavity is formed, care being taken not to approach too near the lining pulp or nerve.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

The instruments illustrated in Figs. 1 and 2 may be used on any of the dental engines.

After the cavity is properly prepared for the reception of the stopping, with the second instrument (Fig 2), there should be cut around the edge of the cavity on the external surface of the tooth, a groove, or gutter, in which to set the gold "cap" (Fig. 3).

On the under side of the gold "cap" are heads, or hooked staple-shaped wire, which sink into the plastic stopping with which the cavity has been filled, and thus serve to anchor the cap ready for finishing whenever the material has hardened—or cooled. If Hill's stopping be used, the cap must be warmed before being applied, by means of the instrument (Fig. 5), by which it is carried to its place.

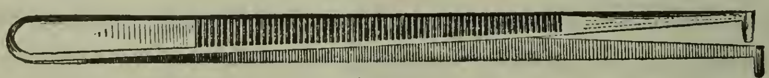

Fig. 5.

It will be found that the proper adjustment of the cap in place depends upon the force used in pressing it home upon the plastic stopping. It will also appear that the pressure will force the surplus material out under the edges of the cap and thus, on its hardening, or cooling, will complete the union between the cap and stopping. Of course, the necessary force must be applied with great care and judgment. The instruments with which this part of the operation is performed are illustrated in Figs. 6 and 7, which, being larger than the external cavity, rest, as they are pressed home, upon the surrounding edge, the centre of the cap being thus prevented from being forced too far into the cavity—the result of which would be the lifting of the cap from the groove or gutter before the material had set.

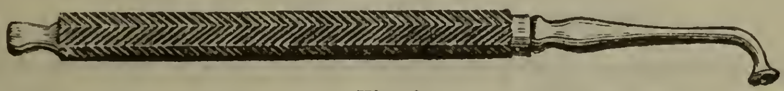

Fig. 6.

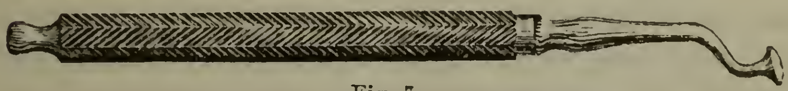

Fig. 7.

Gold caps can be made in different sizes, to obviate the necessity of using such as would be larger or smaller than the nature of the case requires. Fig. 4 illustrates a gold cap with a flange border. After it has been placed in position, a rope of gold foil may be packed in and around the border of the cap, and the gold wire above the cap, by which it has been carried to its place, may now be cut off, and all finished and burnished down.

Where the surface upon which the cap is fitted is irregular, the cap and gold foil may be burnished down to fit into the inequalities, rather than use the file to remove them.

The application of the porcelain or pearl caps is the same except the securing of them, which is effected by dove-tailed projections or platinum pins.

The great merit of this mode of filling teeth over metallic filling consists in the freedom from thermal changes in the material, and all the advantages of a metallic crown, without tediousness to the patient and operator, or any of the disadvantages which are liable when the metal approximates to the pulp. It has also decided advantages over the method of filling by building up with gold foil—even when this is underlaid with plastic filling.

It has come to my knowledge that certain persons, who have chanced to learn of this method of filling teeth, have laid claim to originality in using it, and have even asserted that they had invented it. I trust that what I have here written, besides setting forth subsequently the nature and value of the method itself, may set at rest the pretensions of these charlatans, and place the credit where it justly belongs, viz: with Dr. B. Wood and Dr. Michaels.

EDITORIAL.

THE NEW ENGLAND DENTAL SOCIETY.

The Merrimack Valley Dental Society, which held its twentieth annual meeting at Boston, October 5th and 6th, celebrated the occasion by changing its name to that of the heading above. The meeting was one of importance and of much interest to a large number of dentists from all parts of New England, and the new name which the old Society assumes upon reaching its "majority," is an appropriate one, inasmuch as, for many years past, the roll of membership contains names of dentists from all the New England States excepting, possibly, Vermont and Connecticut.

The Merrimac Valley Society has had a notably successful history for twenty years past, and if the late meeting is to be accepted as an augury of the future, no less, relatively, may be expected of it in the years to come. It takes this new start in life with an active membership of about one hundred and fifty, and a balance of some $350 in its treasury.

By an amendment to its by-laws, meetings are to be held annually instead of semi-annually, as heretofore, which seems to us a mistake, unless our New England *State* societies can be made more efficient, and infuse themselves with an emulation of similar societies in other parts of the Union to a much greater and more uniform extent than has been the case in the past.

The programme of this meeting showed that the society possessed a live, active Executive Committee, and one that understood the supreme importance of looking well after details.

The larger matters are more apt to take care of themselves, but if the little things are allowed to get our of gear, an embarrassing stand-

still of the entire machinery is often the result. The meeting was promptly called to order at the appointed time, and the first session occupied by matters of business—admission of new members, etc. Some little friction was caused when it was learned, by quite a number who had responded to "a cordial invitation is given to all respectable practitioners in New England to join us, and assist in making this society a valuable aid to the advancement of the dental profession in New England," that a *by-law* required that whoever desired to "join" should be the possessor of a degree from certain organized institutions. Certain gray-haired gentlemen, with some brains and less caudal appendages, were at first inclined to regard the "cordial invitation" and the by-law as a little inconsistent, but were easily induced to believe the matter an oversight, and all passed off pleasantly as, of course, similar things must under the cordial good feeling and excellent spirit of the officers and members of this excellent society.

Perhaps this is as good a place as any for us to say that we have often thought that it was a pity that some of our societies seem to be managed so much by the colleges and those in their interest, instead of the profession as a profession, and for the best interests of the profession, present and future. Attempted arbitrary or compulsory legislation, by a class, and that class a minority, does not seem to us the best and most successful method that might be adopted to elevate the profession as a whole, especially in those states where the profession has no special legal status. Those who are wiser than their fellows could do more and better in the direction of an elevation of the profession as a whole, could more readily "leaven the whole lump" by some other course than to withdraw from the "lump" and surround themselves by those only who possess, or imagine themselves to be possessed of, an equal amount of wisdom and feigned respectability. We must confess to a very strong leaning toward the plan adopted by some of the medical profession in many of our western states—a simple convention of physicians, without constitution, by-laws, or code of ethics, open to all schools and no schools; where every man who has an idea, fact or principle, can claim an equal right to the floor and a respectful hearing. He must, however, expect "no quarter" from a critical sifting of the same. These men do not seem to be afraid of the truth, coming from whatever source, and can trust truth to meet error in open combat. We are not opposed to the colleges by any means, nor do we argue against the obtaining of

"degrees." The more, the better, providing they mean anything. But we cannot agree with many who seem to regard the simple possession of a degree as the sure evidence of a superior respectability or reliability. It is *knowledge*, obtained from any and all sources, that should mark a man as preëminent in his calling. And these men, it seems to us, can more effectually inspire others to seek the higher plane by *personal contact* with those they seek to elevate than by secluding themselves within the walls of an assumed class superiority. In other words, the *moral* influence is greater than the *legislative*. This is upon the supposition that societies are formed for the benefit of the *profession*—not for a select few. That something like these views were entertained by not a few of the active members of the New England Society was evidenced in many incidents during the late meeting—one of which was an introduction of an amendment of the by-laws practically annulling the clause referred to, and the evident uneasiness of many under the existing restriction.

The afternoon session of the first day was wholly given up to listening to the address and the exemplification of the subject by numerous experiments, by Dr. W. C. Barrett, of Buffalo, New York. The paper was upon the "Physiology of Anæsthesia," and was illustrated by a large number of very interesting experiments, showing the physiological action of the various anæsthetic agents. One of these experiments proved that the claims of certain prominent authors are not founded upon facts, inasmuch as it was demonstrated that nitrous oxide gas "kills" nearly as quickly as carbonic acid gas. Whence, therefore, the claim that this gas "is a supporter of life?" Dr. Barrett seemed "perfectly at home" with the scalpel, and, as a clinical lecturer, on this occasion, at least, was voted a complete success. Could we reproduce in the columns of the Journal this address, with the accompanying experiments, we should do the profession a good turn that would be highly appreciated. We hope to print the paper at an early date, but for the experiments we must urge that reference be made to the "*operating table*!"—and, by the way, here's a hint to other societies. Let the *operating table* be transferred more frequently from the colleges to the societies; and, when you do so, Dr. Barrett is a good man to wield the knife. At the adjournment of the afternoon session, the society, with its invited guests, were seated at a collation at the Parker House. An hour and a half spent here in a social and informal way served as a pleasant introduction to the regular evening session, which opened at 8 o'clock, and was devoted to

the reading and discussion of a paper by Dr. C. T. Stockwell, of Springfield, Mass. Subject: "The Etiology of Dental Caries. Acids or Germs; Which?" The paper will be found in this number of the Journal.

Prof. Charles Mayr, also of Springfield, gave the results of some extended chemical experiments with decayed dentine, bearing upon the subject. The essayist took the ground that the latest discoveries in the three-fold field of histology, microscopy and chemistry, show that acids play an unimportant part in caries, and that "*germs*" are the active cause of true dental decay. Prof. Mayr's experiments were also confirmatory of this conclusion, showing, relatively, no *solution* of lime-salts, and the presence of substantial normal proportions of lime-salts in the decayed masses. The discussion that followed showed that a considerable interest was awakened in the subject.

The first business in order at the morning session was the reading of a paper on the subject of "Regulating Teeth," by Dr. Thomas Fillebrown, of Portland, Me. This paper mainly served as an introduction to remarks upon a system of regulating teeth, by its author, which was illustrated by a large number of "cases in practice," with a description of the variations of the application of the system to particular cases. A general discussion followed upon the subject of "Irregularities," and various methods of correcting the same, prominent reference being made to the "Coffin" method of "expansions." Following this subject, came a paper by Dr. Barrett, upon "Dental Literature." This paper, also, may be found elsewhere in this num-number.

The election and induction of officers for the ensuing year, and fixing upon a place of next meeting, closed the sessions.

The officers elected were as follows:

President, Thomas Fillebrown, Portland, Me. Vice Presidents, William Barker, Providence, R. I.; James Lewis, Burlington, Vt. Secretary, A. M. Dudley, Salem, Mass. Treasurer, G. A. Gerry, Lowell, Mass. Librarian and Microscopist, G. F. Waters, Boston, Mass. Executive Committee, J. B. Coolidge, Boston; W. H. Tillinghast, Providence; E. B. Davis, Concord, N. H.; J. W. Curtis, Brunswick, Me.; A. W. Buckland, Woonsocket, R. I.; S. D. Hodge, Burlington, Vt.

The next meeting will be held at Providence, R. I., in October, 1883.

A vote was passed instructing the Executive Committee to secure some prominent member of the profession, outside of the society's membership, to give the annual address at that meeting.

Why do not some of the live dentists of Boston and vicinity "*forage*" in that immensely interesting field, the Peabody Museum of American Archæology and Ethnology, at Cambridge? There is much material for statistically inclined individuals among the large collection of skulls to be found there from all parts of the world. Prof. Putnam will, we are positive, be glad to afford any reasonable amount of the valuable assistance he is so capable of giving. Having been collected for the benefit of science, science should not neglect the opportunity.

As there seems to be much difficulty in obtaining just the right preparation of eucalyptol for dental purposes of druggists, we are glad to call attention to an advertisement relating to this drug, in this number. Having used, for some time past, eucalyptol and gutta-percha in root canals, as described by Dr. Parmele in the August number, we can most heartily indorse this method of practice, both for its ease in manipulation and correctness of principle—it being a reliable *antiseptic*.

On page 288 of our September number, in the speech of Dr. Field, we forgot to insert after interest, " at the meeting in London," and after my presence, " in London."

Every member at a society meeting who is wrongly reported will confer a favor on us by sending us a correction, but it must be a really wrong passage, not one that he might have worded differently, to which he applies his criticism.

SOCIETIES.

The fifteenth annual session of the Brooklyn Dental Society was held October 9, 1882.

Officers for ensuing year:

President, Dr. A. H. Brockway.
Vice-President, Dr. F. W. Dolbeare.
Recording Secretary, Dr. C. P. Crandell.
Corresponding Secretary, Dr. W. H. Johnston.
Treasurer, Dr. F. C. Walker.
Librarian, Dr. L. G. Wilder.

C. P. Crandell, *Recording Secretary*,
508 Clinton Avenue, Brooklyn, N. Y.

THE

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AND

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ORIGINAL COMMUNICATIONS.

THE BIOPLASSON DOCTRINE AND ITS CRITICS. IN WHICH ARE THE "FALLACIES"?

BY S. E. DAVENPORT, D. D. S., M. D. S.

It is the fortune of all discoverers, inventors and reformers to have the correctness, the practicability and the sincerity of their discoveries, inventions and reforms questioned. If the questioner is sincere, and is open to conviction when the value of the reform or invention is demonstrated to him, then all are benefited by his outcry against "swallowing whole" a discovery until he can be assured of its truth, or of the necessity for its application. For the discoverer is bound to stand by his "find," and seeking to convert all sincere thinking men to his views, adds much to the knowledge of even non-questioners by the careful presentation of "why and wherefore" in the plain and simple language which one would naturally use in instructing a novice. If, on the other hand, the dissenter refuses to accept a theory or doctrine because it seems to interfere with one of his own, which he thinks—being good enough for him, should be unanimously accepted —the discussion between the expounder of the theory and the non-

believer will still be interesting and instructive if, indeed, the expounder does not see the mercenary spirit of the other, and therefore refuses to "talk." Truth will prevail! When these men, each with a theory, severally discuss their own, the stronger theory gains both from the good and true things which may be said of it and, negatively, from the crushing blows which are sure to be dealt its weaker adversary.

Dr. Lester Curtis, of Chicago, does not believe in the Heitzmann Bioplasson Doctrine. He has written two papers within the last year telling us what he does *not* believe; we are waiting now for him to inform us what he *does* believe—not that it is of such great importance to the scientific world, but it would enable us to decide whether to bury him in the grave with Galen and his "partes similares," with Haller and his fiber theory, or with Schwann and his cell theory.

A man may search and turn in a labyrinth for years and never find the proper way out of it; but when shown and instructed, the labyrinth is one to him no longer.

Dr. Curtis has seen the granules of the white blood corpuscles—perhaps the most distinctive feature of the healthy plastid—indeed, Dr. Heitzmann says that the more healthy the blood the more granular the corpuscles; but he has not seen, or has not been able to recognize, the reticulum which connects these granules. The Chairman of Section I was accorded the privilege of having his blood examined for the benefit of the class of which he was a member. Dr. Heitzmann plunged a small crowbar into the palmer surface of said fortunate chairman's thumb (he recollects perfectly that it was the left thumb, as it is now smaller than the other, though for days after much larger), and mounting a very small portion of the blood upon a slide, placed it under the microscope. The loser of the blood was in one respect disappointed in what he saw; it was not "blue blood," but the members of the class did see the reticulum connecting the granules of the white blood corpuscles, and nearly every evening the presence of the reticular structure was demonstrated in one tissue or another until, finally, when the eyes of the class had been somewhat trained, they saw the fine network in the enamel of the dental organs.

In Dr. Curtis' examinations he has had, it would seem, all necessary advantages as regards microscopes and lenses to enable him to see anything as fine, or even finer, than the reticulum claimed by Dr. Heitzmann to be present in the corpuscle. I think we all believe Heitzmann is correct, and that the reticulum is there.

Not being able to satisfy ourselves, then, that there was anything wrong or in any way inadequate in Dr. Curtis' lenses, believers in the reticulum must conclude that in Dr. Curtis himself, his inadequate examinations, his insufficient microscopical education, lie the reasons for his non-recognition of the reticulum.

If Dr. Curtis had used the heatable stage, perhaps his results would have been different, as the reticulum of the corpuscle shows much plainer at the temperature of from 80° to 90° F. than if examined at the usual temperature of the laboratory. The colorless blood corpuscle is larger than the red, and is present in the healthy blood in the ratio of about one white to 300 red. Much can be told of the condition of the constitution by the microscopical examination of the white blood corpuscle, which so closely resembles in appearance, structure and movement, the amœba. For years Dr. Heitzmann has paid close attention to the study of the blood of people in differing conditions of health and disease; constitutions possessing hereditary taint, constitutions beginning to break down from specific and violent causes, also those in apparent perfect health, and the records kept of almost numberless examinations agree so perfectly as to form a decided and almost infallible rule by which the examinations of blood from patients never seen can be made to assure the examiner as to the condition of that patient at the time.

It looks now as if the microscope was to be the most important factor in hastening the ideal "hereafter" of medical science when "prevention" shall be as much the province of the physician as "*cure*." It stands to reason that the constitution possessing the most energy and tone—in other words, *health*—must have in its make-up the largest proportion of living matter or bioplasson. Colorless blood corpuscles in blood from such constitutions are found to be more coarsely granular, and to possess larger lines of bioplasson forming the reticulum. These granules are demonstrated by Dr. Heitzmann to be but the points or nodules formed by the intersection of two or more lines of the reticulum, therefore are of living matter, and their greater size in the best constitutions forms a strong corroborative proof. Many examples might be given illustrative of Dr. Heitzmann's ability to tell the condition of patients as to health or disease (and many times the exact disease from which the patient is suffering) from the examination of their blood brought to him, unaccompanied by any description of the patient; but in reference to Dr. Curtis' unbelief, it is only necessary to add that the conclusions—always so accurate—are based principally

upon the examinations of the colorless corpuscle, its reticulum and granules, their appearance differing greatly in blood of unlike qualities.

In this connection (an expression, by the way, which the N. Y. Sun assures its readers is bad English), it would seem pardonable to quote from Dr. Heitzmann's address before the New York Odontological Society, in February last, those few lines in which he refers to Dr. Curtis, and which Dr. Curtis asserts are not a sufficient answer to his argument; nor do they, in his opinion, sufficiently recognize the weight and power of his objections to the bioplasson doctrine. Dr. Heitzmann said:

"Lately Dr. Lester Curtis published an article on this subject, and stated that he did not see the reticulum. This is a very modest way to announce that one cannot see what another can. If a person publicly confesses that he cannot play upon the piano a masterpiece of Liszt's we are all willing to believe it; but does it follow that others cannot play it either? What is gained by such a confession? Dr. Curtis gives illustrations of what Elsberg and I have said and seen, and of what he could not see. I mention this because you are all prepared to understand that delicate observations of this nature are not easily made by every one. A great many look in the microscope, but very few can see. If one of you who had never played the violin were handed a good one and told to play a tune, he would say, 'I can't.' Let him practice a few years and learn to play a tune. It is very much the same with the microscope. If you look in it but for a short time you cannot see. It required more than fifteen years' application to enable me to see what can readily be seen, and if a tyro comes and declares that he cannot see, I do not think such assertions should be taken as proofs against facts corroborated by others."

The above would seem to be a sufficient answer to the assertions of a comparatively non-distinguished microscopist, unsupported as those assertions are by any well-defined explanations, or the corroborative evidence of men of note. It is egotistical for any unbeliever who chooses to publish his unbelief to expect a direct, full and carefully prepared reply going over the whole ground, from so busy a man as is Dr. Heitzmann. No pioneer in the scientific world was ever more ready or willing to explain and defend his discoveries and claims than is Carl Heitzmann. He does it in the fearless publication of his "Microscopical Morphology"—which we are all reading with great pleasure and profit—also in his daily teaching at his laboratory, where Dr. Curtis or any other dissenters are welcome at any time, and would

have no difficulty in seeing the reticular structure of the colorless blood corpuscle, or of any tissue of the body, having the advantage of Dr. Heitzmann's specimens, lenses and instruction.

From the perusal of Dr. Curtis' article in the August Cosmos, one would quickly conclude that of the three "*R's*," he takes the most delight in '*Rithmetic*, and while evidently believing the old adage, "figures do not lie," seeks to prove by their infallibility that diagrams *do*. While taking strong exception to that part of Dr. Curtis' article which insinuates against the honesty of Dr. Heitzmann, the writer of this report passes over it without comment, knowing that if Dr. Curtis had the honor of Dr. Heitzmann's acquaintance he surely would not question his honesty, whatever he might think of his claims, for all who have that honor early become assured of the entire sincerity of the man and of his earnest belief in the discoveries he has made.

That Dr. Curtis should "laugh to scorn" the diagrams drawn by Dr. Heitzmann to illustrate his writings, when in Germany he was considered one of the best and clearest artists in that line, and was much sought after to illustrate many noted standard works, is perhaps excusable when we think of the vast proportions which Chicago is rapidly assuming, and remember the testimony of phrenologists concerning the enormous development of certain bumps on the heads out there; but when he seriously attempts to prove by the use of mathematical rules and formulæ that the said diagrams do not and cannot represent what is to be seen under the microscope, he reaches the height of the ludicrous if not the ridiculous.

He counts the lines of living matter represented in one of the diagrams, also the interspaces, the sum of which he multiplies by the width—per linear inch—of each line and interspace, divides by the number of diameters which he supposes the specimen to have been magnified, and his conclusion gives him so large a corpuscle that he says at once: "This diagram is faulty, is 'made to order;' hence Heitzmann's bioplasson reticulum is not present!" Does Dr. Curtis expect diagrams drawn off-hand to represent, as if they were photographs, lines and interspaces absolutely correct as to number and positively accurate as to their width even to the thousandth of an inch? Some idea of the cause of the breezes from the West always being so *fresh*, now dawns upon us.

From what the writer can learn of Dr. Curtis, he is an earnest worker after truth, and undoubtedly is sincere in thinking the reticulum is not present as claimed, though he asserted at the meeting of the

American Society of Microscopists, at Elmira, last August, that the reticulum, or something like it, must be present to account for the contraction, extension, etc., of the living matter, but that he could not see it, which certainly seems to be sensible talk. There are some hopes that Dr. Curtis will soon be converted to the bioplasson doctrine, as Dr. Fuller, of Chicago, an intimate friend of his, studied with Dr. Heitzmann last June and is a firm believer in the reticulum.

S. Stricker, who until quite recently has been a believer in the Schwann cell theory, published in 1880 certain statements from which a few extracts may here be made and appended with advantage:

"The so-called migrating cells in the substantia propria of the cornea . . . are neither migrating nor isolated cells. We can easily see . . . that portions of their bodies gradually assume the appearance of basis-substance . . .

The basis-substance under favorable conditions exhibits, in its interior form, changes like those of amœboid cells.

A net-like arrangement, fibrillæ and other forms, come and go.

The basis-substance and the so-called migrating cells in it represent a continuous mass . . .

The epithelia of the cornea, with their so-called cement-ledges, likewise form a continuous living mass.

The salivary corpuscle is traversed by a sharply marked trabecular structure which, so long as the corpuscle is fresh, executes lively wavy motions. The waving gradually ceases on the addition of certain salts, and the reticular structure disappears. This waving is now replaced by very slow form-changes in the interior mass."

A. Spine, who works in Stricker's laboratory said, in 1879: "We are satisfied that from the cells of the hyaline cartilage project solid offshoots; these arise from the bodies of the cells, pervade the basis-substance and blend with the offshoots of other cells."

CRITICISM.

BY DR. WM. H. ATKINSON, NEW YORK.

"The cup which my Father hath given me, shall I not drink it?" John XVIII. 11.

The trying circumstances under which this phrase originated may well be called to mind when our most earnest efforts to be useful are spurned as unworthy by those for whom we are working. Parents and teachers often find themselves thus situated when endeavoring to make the path of life or study easier for children or pupils than had been accorded them in their own days of non-age or study. There should be no wide gaps between teacher and pupil, i. e., teachers

should be taken from the next class above that from which the class of pupils is to be drawn. There is no more thankless position than that of bringing conviction of lack of knowledge to those who have been regarded as embodiments of everything known. Yet without just such a position being taken by some one, we can have no progress. Of this, the procedure of professional associations for improvement are examples. Societies that need constitutions, by-laws and codes of ethics, can never be the exponents of greatest advancement. This has been exemplified by the past, and is being shown in the present. The American Medical Association is a notable example of the way not to advance. The American Dental Association, under the lead of some who desire to be *regarded* as learned, able and competent much more *ardently* than they wished *to be* all these, modeled after the American Medical Association to the extent of even copying their organic blunders. The American Dental Association has had no greater stumbling block than this class of members. Whenever new discoveries are announced which clash with the old fogy misunderstanding of principle and fact, these are they who object, while openly confessing that they " do not understand a single sentence of the new presentment." One of these liberal bigots—who claims to be able to diagnose disease and prescribe the remedy therefor, correct the grammar, sense and value of speech or writing, and act as responsible censor of all that speakers or writers say or intend to say or ought to say—diagnosed a case as " progressive locomotorataxy " which has been running on for years now well into the teens, and the subject still is able to assume the work of accomplishing the herculean task above indicated. His last strong effort was a resort to political wire-pulling and caucusing at the meeting of the American Dental Association in Cincinnati to induce the members and Chair to declare the report of the Chairman of a Standing Section to be out of order, or otherwise have it dishonored, before he had seen or heard a single word of that report. Are such mis-diagnosis and such mis-malediction the acts of a safe guide in diagnosis and practice ; or a reliable teacher, in the face of his open confession, after having heard the report referred to, that he " had given it his best and most earnest attention and yet did not understand a single word of it ? " To those not devoid of natural affection, religious sentiment, or love of the race and of the truth for its own sake, this is a difficult situation to deal with. If the American Dental Association were composed of sound logicians and ripe moralists it would be an act of wisdom to let such scenes

pass and be forgotten. But as many are recruits from other fields of study, that do not embrace special regard to these higher responsibilities of logic and morals, it becomes a duty to the unsophisticated to take some notice of the negative method of illumination by " answering a matter before he heareth it " which " is folly and shame to him," as saith the Scripture. [As recorded Proverbs XVIII. 13.] Scripturians will recognize " There is a spirit in man and the inspiration of the Almighty giveth him understanding." [Job XXXII. 8.] Please observe the tense of the verb. It is not past nor future, but present. Revelation of truth is not of the past nor future, but *now*, and it comes through immediate " inspiration." The old fogy bigots dogmatically assert that there is no sufficient nor plenary " inspiration " but that which comes through the channels recognized by the priests, kings and legislators of the past. They never condescend to reply to the query, whence the ability to understand and interpret the *record* of the " Inspiration of the Almighty " made to the fathers. The inspiration of the atmosphere through the lungs and skin, by which bodily activity is maintained, is the analogue of that finer inspiration by which the mind and spirit are maintained from the hyperion !

" I am not come to destroy but to fulfill," was the plea of Him who spoke as " never man spake." The Romans and the Jews hated Him because they could not answer or " bring aught against Him " truthfully. He meekly bore it and went on doing the work He was sent to do. When they marveled at His exhibition of love and eloquence, He said, " Greater work than this shall ye do if ye be followers of that which is good." Railing accusation, such as " gibberish " and " bosh," cannot cover from observation the stupidity that attempts to hide behind the vapid cry of " Great is Diana of the Ephesians ! "

The possession of a diploma that was conferred at a time when the curriculum of study of the whole range required was less than is now necessary to properly pass the single chair of chemistry, does not count much, even if it were had in the same class in which a man was graduated who had grown to renown since that event. Many a parchment has stood in the way of investigation, just as the near shilling has stood in the way of grasping the more distant pound. In like manner the musty record of old inspiration is grasped so tightly as to shut off the channels of present living revelations of vivid convictions of truth in small and in great things !

The introduction of new interpretation of law is the fulfillment of the old. The new teaching is to inaugurate the acquisition of truth

in small things in a small way, and not to wait for cataclysmic avalanches that blind us instead of thoroughly illuminating the truth! The greatest mistake of prophet, priest, king, legislator and teacher is the habit they all have had of regarding their investigations, decisions and edicts as finalities. Nothing short of omniscience and omnipotence is competent to establish finalities; and this has not been the manner of the divine procedure hitherto in the production of planets and inhabitants of planets.

Authority resides in the mind that perceives the truth, fact or philosophy. Anything short of this makes the dupes or slaves we have hitherto gloried in being. Let every man be *fully* persuaded in his own mind, and let him "set down naught in malice!" "Let a bear robbed of her whelps meet a man, rather than a fool in his folly." Prov. XVII. 12.

A CLASS OF PULPLESS TEETH. THEIR TREATMENT.

BY A. M. ROSS, CHICOPEE, MASS.

I have prepared this paper without reference to the literature of the subject of treating pulpless teeth, it being rather a result of long experience with a certain substance with the rationale of its application to a certain class of teeth. I know that the substance is used, to some extent, by dentists to accomplish the result for which I use it, but I do not recollect of ever reading any *scientific* reason *why* it is used. About eight years ago, while in practice with my father in Troy, N. Y., I had my attention called to the permanganate of potassa by a friend, a druggist in the city. We made many experiments with it—not confining our attention to spittoons—to prove its antiseptic property, and we were surprised at the time by the fact that but a small amount of the crystal was necessary to decompose a comparatively large amount of putrefactive matter.

Since that time I have used it extensively in my practice in treating a certain class of pulpless teeth.

I will not say that the subject of treating this class of teeth is an uninteresting one to dentists, but my methods and reasons for them may be quite uninteresting, and I will use as few words as possible in so doing.

I believe that the use of the permanganate of potassa in all teeth where decomposition of the pulp has occurred, is attended with greater

certainty of result favorable to the pericementum and subjacent tissues than by the use of salicylic acid, carbolic acid, and other preparations from phenol. Of the derivations of phenol it may be safely asserted that they *prevent* decomposition of normal albuminous matter by coagulation, deeply or superficially—but that they do not, cannot decompose decomposition products of albumen, their action being a coagulating one rather than a decomposing one. I refer to the contents of the walls of the pulp-cavity and do not wish to be understood as applying my remarks to pericementum for this reason: Upon the death of the pulp the albuminous matter in the dentinal canaliculi coagulates at first, and thus the structure is rendered opaque. This is the first change that occurs, which is followed by the decomposition of the coagulum. Now if the pulp is removed before death, and the cavity immediately saturated with carbolic acid, a coagulum is formed that is not so easily decomposed; or if the treatment is adopted after the removal of an arsenized pulp, the result may be as good, because arsenic does not coagulate albumen, if our esteemed friend, Prof. Mayr, is correct. (I would say in parenthesis that in view of the circulation that is maintained in the cementum and the periphery of dentine of "dead" teeth, and the fact of long continued action of arsenic, unless the arsenized fluids can be coagulated, I think that something else than arsenic for destroying pulps should be used.)

Death of the pulp is followed by decomposition. Decomposition of the pulp from any physiological or pathological cause will produce the sulphides of albumen, sulphuretted hydrogen, etc.

After the pulp-chamber of the tooth has been freely opened, so that the canal or canals may be entered by a smooth broach, less than a grain of the potassa is placed in a half ounce of cold water, or about in that proportion, about a drachm being prepared for a treatment. A little absorbent cotton is roped on the broach, saturated in the solution and introduced but a short distance, and immediately removed. The color is changed. The fluid as introduced is a beautiful purple; upon removal it is brown. In this way a number of twists of cotton are wet in the solution, each in turn forced further into the canal, until the bits of cotton upon removal are found to be but little changed in color from purple. Thus I have used as many as twenty little twists of cotton in a *first* treatment. By taking precaution to never make the solution too strong, I have obtained most satisfactory permanent results. I have frequently conversed with Prof. Mayr upon this subject and have been enlightened upon it very much. I will briefly

state that the permanganate of potassa is manganese peroxide, plus oxygen, plus potassium; that there is an excess of oxygen ready for combination; that this oxygen being brought into a cavity containing sulphides of albumen or sulphuretted hydrogen, these are decomposed and water is formed, etc., and the permanganic acid is thus reduced to the peroxide of manganese, or oxide of manganese, according to circumstances, both of which are brown in color. The use of this chemical in treating a certain class of pulpless teeth insures the decomposition of those products that are the feeders of pyogenic membrane, and the sense of *sight* being quite sufficient to make apparent the accomplishment of this. We hear much talk about the ease and certainty with which certain bicuspid and molar buccal roots are opened, cleansed and filled with gold, etc. A careful study of *many* such roots by transverse sections under the microscope would show how utterly impossible this is in a great majority of cases, and how impossible it is to conjecture about the size and character of canal by outside formation, and we don't even have this to guide us except in cases of replantation.

I speak of this to show how impracticable much of this talk is about *mechanical* dexterity in treating and filling pulp canals. It is misleading to those who do not know much of tooth anatomy. In many cases it is not possible to reach the apices of roots, and the closing up of that portion of the root *has to be done as near* the apex as possible. Now if the canals in many bicuspids are plural, elliptical in transverse shape, in buccal roots of superior molars the same, how are we to be certain of a good result in any case except where we use an agent that shall form new compounds and leave a veritable and comparatively insoluble new product in place of the old decomposing one? An agent that can be flooded over all surfaces? This agent *does* stain dentine, but so slightly if the proportions of crystal to water are right for each case that the surface of the tooth does not reveal it. But is not the oxide or peroxide of manganese preferable as a deposit in the open ends of the dentinal canaliculi than some of the products of decomposed albumen? The proper *treatment* of this class of pulpless teeth is of as much importance as the after *sealing of the ends of the canal;* both operations being thorough, the material with which the *root is filled* is of very little importance.

SOCIETIES.

CONNECTICUT VALLEY DENTAL SOCIETY.

The nineteenth annual meeting was held at the Massasoit House, Springfield, October 26 and 27. After transaction of some routine business, and the election of new members, viz.: Prof. R. R. Andrews of Cambridge, Drs. W. F. Andrews of Springfield, W. L. Roberts of Spencer, J. W. Gould of Worcester, J. B. Coolidge of Boston, and D. L. Church of New Haven, Dr. S. E. Davenport suggested that it was a good time to consider the place for next meeting. The last meeting at Amherst was the most pleasant, and it was so considered by all the members present. An excellent idea is to make the June meetings the pleasantest, because they have been the smaller, as a rule, of two meetings in the year. Therefore, the locality should be selected with care. A good idea will be to consider Mt. Holyoke for our next meeting. Dr. Heitzmann might be induced to come. The matter was referred to the Executive Committee.

The subject, What, if any, are the Unfavorable Results following the Administration of Nitrous Oxide Gas? was taken up.

Dr. J. J. Vincent did not give gas, believing it injurious more or less to every one. The effect upon the lungs he believed to be similar to that of hot water upon a sponge. The lungs were like a sponge in a certain sense, and only those without conscience should ever administer gas.

Dr. S. B. Bartholomew thought he was a man of conscience, and he had given liquid gas for ten years, and gave it constantly. Had never considered it an unsafe article, and he had been convinced of late that he was right. Some of us heard Dr. Barrett's recent address at Boston, of two and a half hours, in which gas was recommended as the safest anæsthetic. It should be given properly. The trouble is that patients become asphyxiated by not having air enough; the blueness is not caused by the gas, but by carbonic acid. Give the patient a little air as the blueness appears, and without interfering with the anæsthetic effect, this color disappears. I have never had a case of headache or nausea following the administration of gas.

Dr. S. E. Davenport: Dr. Bartholomew says blueness is not caused by the gas but by insufficient air.

Dr. Bartholomew: I said a little air causes a departing of the

color. I have sometimes been two or three minutes bringing the patient under the influence.

Dr. Vincent: Why is this?

Dr. Bartholomew: The question is a natural one, but the answer is easy. No one is always in the same favorable condition, and apoplexia might be brought on by too heavy and continuous breathing of the gas.

Dr. S. E. Davenport: Dr. Bartholomew's idea of giving a little atmospheric air with his gas is new. I wonder if the purple appearance is always an indication of anæsthesia. I wonder if a patient given air, and blueness departs, if more gas is not afterward necessary.

Dr. Bartholomew: The administration of air after giving gas is in a large number of cases absolutely necessary.

Dr. Morgan: A certain writer has said that no one can become thoroughly drunk without there being a lesion of the brain. Whether this is true or not, it is reasonable to suppose that there is more or less injury to the nervous system—of which the brain is the center—from an agent that acts so rapidly as gas does. I could not approve of the practice, but if the operator could give ether as readily as gas, gas would soon be banished from our offices.

Dr. Stockwell agrees with Dr. Morgan, and does not give gas of late once where he formerly used it twenty times. He believes that injury is often the result. The injury may not be suspected at the time, but a train of effects is started which sooner or later may even result fatally. Has had cases where severe headache and even vomiting have followed the administration of gas. He understood Dr. Barrett somewhat differently than Dr. Bartholomew seems to have done. Dr. Barrett demonstrated that nitrous oxide gas "kills" nearly, if not quite, as quickly as carbonic acid gas; which proves that the theory of some, that nitrous oxide gas is a "supporter of life," is not well founded. That it so seldom kills instantly is no proof that it is harmless, and that it may not be the unsuspected origin of very serious more or less remote disturbances. Believes ether to be safer.

Dr. Miller said: We must not boast of our experience, for evidently that does not count. Related his own experience with gas, dating from about the time of Dr. Colton's gas exhibitions at Westfield. It had not been uniform, and it had been sometimes very unsatisfactory.

Dr. Jewett wanted to know if there were any special indications which would guide one in the administration of gas.

Dr. Howland said that purity of the article was first required. Look to it by careful test, that the nitrate of ammonia is pure. He made his own gas. Had done so for years, and gave it sometimes nine times in a day.

Adjourned to 2 P. M.

Afternoon Session—First Day.

Election of officers: President, N. Morgan; Vice-Presidents, A. M. Ross, S. E. Davenport; Secretary, A. M. Ross; Assistant Secretary, C. W. Strang; Treasurer, W. H. Jones. The Executive Committee appointed by the President elect: S. B. Bartholomew, George L. Parmele, A. J. Nims.

Dr. Searle introduced Drs. W. H. Atkinson and Frank Abbott to the assembly, who had just arrived at the meeting when the election of officers was completed. President Fones then delivered the annual address. (The address will appear in January number of the Journal.)

Section 1. Chairman S. E. Davenport, after reading an interesting report [This report may be found elsewhere in this number.] called on Dr. A. F. Davenport, of North Adams, to report on Anatomy. The doctor responded as follows:

"Mr. President and Gentlemen: Anatomy is an old and familiar subject—one which we have long regarded as the foundation of dental as well as medical science. But the knowledge of anatomy, unlike its kindred sciences, has to be obtained largely by cuts, charts and diagrams. Gray understood this in the preparation of his masterly work on this subject; for very few students would make either descriptive or surgical anatomy a profitable study were they not aided by illustrations. Therefore, in view of this fact, I have executed a drawing which will illustrate the subject better perhaps than anything I can say upon it. My purpose in preparing it has been to present it to the Society, that it may be preserved among its archives for future reference. The drawing is a delicate one and will require framing, and should the Society see fit to accept it, I propose that it be kept in Mr. Williams' Dental Depot as a convenient center; and, if the Society see fit, it may be hung in the room in which the annual meeting is held." The unveiling of the Doctor's work, which he had purposely not done until he had concluded the above remarks, brought forth loud cheering and applause, for it proved to be a finely executed crayon portrait of Dr. W. H. Atkinson. As Dr. Davenport raised the

veil, he said: "We all recognize in this drawing the *tip top blue blossom of Dental Anatomy!*"

A vote of thanks was given Dr. Davenport for his gift, and he and Dr. Stockwell were appointed a committee to take charge of the portrait and have it suitably framed.

Dr. Atkinson: I cannot disguise my surprise, and yet I ought to have known that something was up, because I was asked to sit for a photograph. I am pleased, and more pleased than you are, at this token of your regard. I want to express my thanks for this report. I love art, and could have been an artist if I had had culture. Therefore, I feel that I can appreciate this work of our beloved friend. Though not a judge of portraits of myself, I believe this to be honest work, and it is honest work that the enlightened world wants. I want the honest professions of dentistry—*you*, as naturalists, to shed your legitimate light upon the world. Let us hope that none of us are without knowledge, or that any of us are supposed to possess all knowledge. Again I thank you.

Dr. Frank Abbott: I hope and believe that the truth will prevail. I know it as a fact that Carl Heitzmann has found a great truth. I have studied long and earnestly in his laboratory, and not my testimony alone, but that of others, also, is before the medical and dental professions corroborative of his discovery. He says that if you will study hyaline cartilage, looking, and carefully drawing what you see, giving time and care, pretty soon it will dawn upon you that there is something there that you could not see before. I have seen the reticular structure time and time again. I have watched the amœba, following its movement, seeing the projection of a part of its body and its contraction, and thus the movement of the whole. I first observed in its contents dots or granules, and these, I afterwards saw, were connected by delicate lines. Dr. Heitzmann takes this organism as typical of all animal life. We are no more than a large amœba. One of the most difficult tissues to demonstrate the reticular structure of, was the human tooth. The enamel was formerly considered as a mere crystal, but it contains a reticulum of living matter. The dentine shows this structure more beautifully. Dr. Bödecker and I studied in Dr. Heitzmann's laboratory, learning to prepare and mount specimens. I have prepared and mounted there between 600 and 700 specimens. Dr. Bödecker has mounted probably 1,500. Dr. Atkinson has been our monitor and prompter, prodding us on in our work, and I hope he may give us something more than he has yet, to do in this line of research.

Dr. Stockwell: Does the reticulum extend through the meshes of enamel?

Dr. Abbott: The same as shown by the drawings in Dr. Heitzmann's book.

Dr. Stockwell: Does the mesh show the structure?

Dr. Abbott: I did not say that, but I believe it is there. Our objectives are not powerful enough nor perfect enough to show this perfectly.

Dr. Niles: What powers do you use?

Dr. Abbott: About 1,400 or 1,500 diameters.

Dr. Niles: Do you use mica for covering glass?

Dr. Abbott: No; we use an extremely thin glass cover.

Section 2.

Dr. Jas. McManus, Chairman: I have nothing further to offer than papers by Dr. Stockwell and Prof. Mayr, and Drs. Bartholomew and Searle.

Dr. Stockwell's paper, "Etiology of Dental Caries," etc., appeared in the November Journal. Prof. Mayr's experiments were then reported. Following this was a paper by Dr. Bartholomew.

Dr. Searle: There are gentlemen present who can entertain the meeting better than I, and what I have to offer is very little. My experience has been such that I cannot reconcile caries of teeth with an acid theory, but very much of this disease I can reconcile with a septic theory. There is not a case of artificial caries produced that is like natural caries. Magitot does not show experiments that prove likeness to natural decay. The germ theory will better explain the process. You know it has been stated that cotton thoroughly prevents the approach of germs, that carbolic acid destroys them, that glycerine glues them together. I have a case in mind that surprises one. Over thirty years since, I had hastily finished some fillings for a lady, and in a large molar cavity I had neither time nor courage to fill with gold, I carefully packed in a solid filling of cotton. What was the result, do you suppose? I looked at this tooth four years afterward, took out the cotton, and found the tooth sound and hard under the cotton. I thought it had done so well I would refill with cotton. Several years afterward I found it filled with tin. Dr. Blank put in tin, thinking cotton had been there long enough. I believe the cotton excluded the germs and rendered the contents of the cavity inactive. The germ theory is the more satisfactory theory, but still I am puzzled in this respect. If I have two centrals, for instance, one

is decayed the other is not, why is this? neither theory fits such a case, unless that germs found lodgment on one tooth and not on the other. Aside from some such special instances, the germ theory is the most rational one. You know that surgeons will not operate except under carbolic acid spray in large operations, because they would keep from the freshly cut surfaces the germs existing in the air. I use carbolic acid and glycerine in cavities, and don't care to dry out all the carbolic acid before filling, and I must abide results.

Discussion deferred to evening session.

Adjourned to 7 P. M.

EDITORIAL.

When in January last year we started the Journal, we thought we would do very well if we could earn from the profession support enough to keep us afloat, and we did not expect anything like the actual success attained by the Journal. We have demonstrated once more that there is interest in the profession for scientific even relatively abstract truth, and that a journal can exist quite independently from a dental depot or a great university. Will it be necessary for us to beg our old subscribers to renew their subscriptions, and will they feel that something important for them would be lacking on their desks if they did no longer receive the New England Journal of Dentistry? We hope to have gained a foothold strong enough to lose no subscriber for the ensuing year, but rather to see the name of every dentist, who reads, on our subscription list.

We hope that our scientific inclinations have been appreciated by the profession, but we know some will say: "What is the use of all this theoretical stuff? What we want is practical rules and formulæ." Let us hope that never the time will come when we are able to do this; we would be afraid that the end of progress was near, for we cannot imagine any greater degree of stagnation than knowledge brought into formulæ; it may do very well for weak minded people, but we hope that humanity never will sink to that. Let us not be misunderstood. We do not mean that there should not be some short, practical rules for people who cannot do all the studying themselves, by which they can get along in complicated cases; but if these rules are to supersede their own thinking, we wish that no

such rules could be given. If our opposition to old venerable (?) theories had no other effect than to put people on their own resources, we would consider our task fulfilled. Never any theory is perfect; we only approach truth, as we only approach falsehood, without ever reaching either absolutely. Only when people have learned to pick out from any statement that which according to their conception of facts, is nearest the absolute truth, will they have advanced to that standpoint which alone makes them their own thinkers. We never consider any one absolutely wrong, however absurd a statement may appear to us; we only consider him more remote from the truth than we are; personally, we never are concerned in a dispute as to the truth or falsehood of any statement in dentistry; we have no interest for or against a certain theory; we only do not believe in self-deception. It is precisely the criterion of a sane man, that his views are in accordance with outer facts, and not only pleasing sentimentalities produced from within. To take an illustration: People afflicted with progressive paralysis are as a rule very happy; they do not feel any pain; the future is exceedingly bright for them; they are living in imaginary everlasting abundance, etc. But will any of us wish to be affected in this way for the purpose of being in a happy delusion? And yet great world-important delusions are being defended every day on this plea of the insane, that they render people happy. The delusion is none the less so because it refers to relations towards the Supreme Being, than because it refers to the causes of caries, etc., and while millions of people are worrying themselves about the supposed aims of a Supreme Being of their own creation, dependent on their more or less perfect knowledge of facts, the number of those interested by any theory in dentistry may not be thousands, but to them it ought to be just as essential and important to get at the truth concerning their special vocation, as it is for men in general to learn something about their destiny, and we should not have any less a conviction in these small things than in religious truth which we deem all-important, though we are far less able to get certain results and have to accept a large amount for granted which we never would accept, if it was to involve the expenditure of only five cents. Let us be honest, and strive to advance, no matter if it agrees with our former opinions or not; it will cause us a little uneasiness during the period of transition, but after we have digested mentally the new facts, we will be fed with real food that will give us real strength, and not with watery squash that produces a watery plethora and deceitful appearance of health, which

will succumb to a first attack of a strong different opinion. While we therefore rather wish to work in the line of general advancement in scientific dentistry, we shall not lose sight of the fact that practical suggestions that mean dollars and cents are also not only useful, but even necessary.

The department of *Operating Table and Laboratory* will be under the special editorship of a practitioner of as high standing in the profession as any.

Our department on *Societies* is managed by a dentist who for years has been the secretary of a large and prosperous dental society.

Last year we gave several reports of meetings of societies as far verbatim as we thought it conducive to the best interests of the profession as a whole; but our experience with these reports has not been very favorable. Few men speak so correctly that their words can be printed immediately without rather extensive stylic alterations; those we have to make, and if they do not come out exactly as the man who talked wishes to have them appear, they send us correction after correction, so similar to what we published ourselves that it is only by sheer politeness that we republish their speech again. Many people who have never been reported do not know how imperfect sentences they make; they think that their sentences are all perfection, and it is only the short-hand writer who has to make up the tail of a sentence that commenced with "if," who knows these human failings; while we therefore personally prefer a poor speech really spoken to one made up at home, but put before the dental world as spoken, we have to accept that slight bit of what shall we call it—inaccuracy, and will have to bring either extracts or home-made speeches.

Our *Selections and Abstracts* we do not put in to fill up space that we cannot fill otherwise, but because we consider the articles selected as of special bearing to the theories defended by us, or because we consider them as giving valuable information in practical directions.

Tolerance is an insult if exercised towards a thinking man; it would show contempt of his brain-power if we would not try to persuade him to change his views as soon as we do not consider them right. While we therefore fight on the subject of opinions, let us never forget that not the slightest degree of animosity exists with us against the individual thus attacked, and that any construction of any sentence in this sense is a mistake—we repeat, it is a mistake, either brought about by an imperfect wording on our side or an imperfect reading on the other side. Soyons amis, Cinna—Let us be friends, though we may be opponents and antagonists.

RAMBLINGS AMONG THE JOURNALS.

Die Zahntechnische Reform (The Dental Reform) is the title of an excellent and very progressive German paper appearing at Berlin, and edited by Gustav H. Pawelz at Charlottenburg, near Berlin. From the May number we see that they discipline also on the other side of the water, members of dental associations for publishing price-lists in the papers. "Party discipline is the cement of all the activity of the associations," says the reporter. We are amazed to hear such harsh despotic rules among people whose laws and customs are formed under the influence of the French ideas of liberty. A patent is described to produce a metallic coating on rubber plates by incorporating platinum and gold filings into the rubber. Why not right away a metallic plate? How much old fogyism still is reigning in the "country of the thinkers" is evident from the fact that a dentist has been given the melodious title of "Fürstlich Lippe'scher Hofzahnkünstler," or, translated verbally, Princely Lippean Court—Tooth-Artist. (!) The greater part of the June number of the same journal is filled with the question as to the position of the dentist before the law, something of far less importance to us than in European countries.

W. Kay, of Berlin, gives a process by which the wrinkles of the palatal mucous membrane may be copied to perfection, in the June number of the same journal.

A very dangerous arsenical preparation is recommended as new and efficient—the fluid invented or rather mixed by one Wickersheimer for the conservation of corpses, viz.:

1 gallon of water,
3½ oz. of alum,
¾ oz. of salt,
½ oz. of saltpeter,
2 oz. of potash,
½ oz. of white arsenic.

The mixture is filtered and mixed with 40 oz. of glycerine and 10 oz. of wood-spirit.

This mixture created in its time considerable stir, because it was thought to possess quite new and extraordinary powers in preserving human bodies, but its antiseptic powers are more due to its strong alkalicity, which seems to us undesirable in teeth, while we all know from long experience our little unreliable friend, arsenic; hence, be careful in using this new preparation of arsenic.

A standing and almost comical item in the paper is the list of

American D. D. S.'s against whom the laws seem quite especially severe. Every number brings the names of some who have been fined from $15 to $75.

The *Independent Practitioner* of September, 1882, contains a very interesting article by Dr. F. Y. Clark, on Bacteria as the Cause of Decay. On account of the interest manifested at present in this subject, and of the fact that Dr. Clark almost alone stood up for the view in question as long as ten years ago, and that he stuck to it in spite of all the sneers of the best men in the profession, who always were ready to "know all about it," we read also this article as carefully as possible, and we are really astonished to find so many views completely agreeing with our own opinions about the subject. His passage on fermentation seems to us a sketch only which was not meant to be criticised word for word in the most searching manner. Dr. Clark defines fermentation very oddly, to us at least, as "the converting of organic or inorganic matter into something else." Without taking a humorous view of this definition, we will adduce only a few instances to show that the definition cannot be maintained for a moment. If we burn wood we evidently convert it into something else, but would Dr. Clark call that a fermentation? or, if we make sulphuric acid out of sulphur, we "convert an inorganic substance into something else," yet will we have to call the process, according to Dr. Clark, a fermentation? Also, the distinction of these kinds of fermentation: lactic, alcoholic, butric, acetic, ammoniacal and putrefactive, as he gives them in his paper, seem to us not by far as proved to be distinct or even as having anything in common, as Dr. Clark states. There seems to us no doubt that in the light of the latest investigations of Pasteur, Tyndall and others,

FERMENTATION *has to be defined as the transformation of non-azotized (non-albuminous) matter into other non-azotized substances by the activity of certain distinct, at present not yet always sufficiently-specialized, lower organisms.*

PUTREFACTION *is the transformation of azotized albuminous substances into other, either organic or inorganic substances, by the activity of lower organisms different from those producing fermentation.*

To be justified to call a process putrefaction, it seems further necessary that the products should be offensive to our senses; but the latter is a vague subjective element which properly ought to have no importance with the naming of a physical process, but without that restriction the origin of every human being would be due to a

process of putrefaction, because everything is there to justify it. Sometimes the products of this process are even offensive to our senses, like the Guiteaus, prize-fighters and other roughs, but common people would probably very much object to such an application of the word to their origin. Dr. Clark seems to us to think that evolution stands or falls with the experiments of Bastian or Tyndall. Evolution is a fact of history, and as such it can be proved as little by experiment as the facts of Homer, or the Bible, or of any other writer of old and modern times. No one has seen the origin of the first organism, and as long time as we do not have any more plausible theory about it than generatio equivoca, we have either to accept it, if our mind runs in the line of theories, or we let it remain in suspense until further discoveries give us a clue to the conundrum. But Darwin's theory is at present as well proved as any of the astronomical theories, and we will not reject e. g. Kepler's laws because they do not tell us anything—yet—about the origin of the planetary nebulæ, etc. About the statement, "organic matter cannot of itself bring about inorganic matter no more than inorganic matter can bring about organic," we could make a beautiful squabble, but we do not intend to create the impression that by finding fault with two or three sentences in the paper we do not agree with the hundreds of excellent passages remaining.

Le Progres Dentaire is the title of a very good French dental paper appearing at Paris, of which unfortunately very often nothing but the wrapper arrives at our place. We do not know who is to blame, but we are afraid the economical French wrappers are not destined to stand the strain of the American mail bag. We find it a sad experience that nowhere is mail-matter so roughly handled as in the territory of Uncle Sam. As far as the copies have survived, we find the journal an excellent representative of our art in France. Its number of September prints an extract of Coleman's "*Manuel de Chirurgie et de Pathologie dentaires*," as the title is in the French translation of Dr. Darin. The next article is a translation of Dr. Fletcher's Practical Dental Metallurgy. Dr. V. Galippe tells an interesting case of loss of the teeth, together with locomotoataxia.

An article by Dr. P. Lucas Championnière insists on the importance of masticating hard substances for the health of the teeth, like the hard bread of the Germans and other northern nations.

If you read a French paper, do not forget the knife, for they never are cut, which does not seem to us a very agreeable thing.

The medical faculty of Paris has proposed the following principles for the right of practising dentistry in France:

1. A course of two years' study in a medical school.
2. Two terms of practice in a surgical clinic.
3. Two years with a dentist or in a dental college.

An examination is finally proposed in general medicine, including an operation on a person afflicted with a disease of the mouth, and general dental practice.

The dentist must be 25 years old. The road is less easy than in the U. S.!

Dr. J. P. Parker, of Bellows Falls, Vt., sends us a communication referring to No. 10 of the Journal about the "chalky" appearance of teeth acted on by muriatic acid. He says: "If I immerse a tooth in a 5 per cent. solution of muriatic acid, the root becomes gristly, while the enamel becomes white and chalky, as I spoke of. Does not the acid have the same effect on the enamel as on the dentine? If different, what is the difference?"

The outward and plainly visible appearances here mentioned are perfectly in accordance with what we observed ourselves, but the explanation of this fact does not seem to us very difficult. It is due to the different quantities of organic substances and water in these two tissues. If we dissolve by muriatic acid the 60 per cent. of lime-salts in *dentine*, there remain still some 30 per cent. of organic substance, combined with a large amount of water, which gives still quite a solid structure; but if we dissolve the 97 per cent. of lime-salts in *enamel*, the remaining 3 per cent. of organic substance with the necessary amount of water are not sufficient to give a structure that resists enough the excavating instrument to be called gristle; the excavating instrument goes so easily through it, that we can no longer call it gristle, but have to call it something softer, and only from remote resemblance we may call it "chalky." I think the term chalky very good, as long as it is only applied to the physical appearance and not to the chemical composition; we only might prefer, in comparing the appearances, not to use a simile that might mislead, and therefore would perhaps prefer to have it called crumbling or powdery, or any other suitable term referring to the mechanical appearance only. The whole dispute was a mere word splitting, but as very many ideas cling to words as such, we thought it might prove useful for somebody's instruction to catch the gnat and see how large it proves to be.

We start our criticism of what we consider one of the most important works on the microscopy of the tissues, produced, not only of our century but of all times—the volume of Dr. Carl Heitzmann on Microscopical Morphology of the Animal Body in Health and Disease. Our fellow-editor, whose special department microscopy is, properly opens the series of criticisms which we intend to bring. We do not think that any dentist up to the requirements of the times will fail to procure the volume for himself. It is no kind of business interest which prompts us to recommend the work so warmly, but the real and thorough conviction of its real and deep value. It is a volume inferior to none published in this century in this line.

Operating Table and Laboratory.

Dr. A. Colton, of Hudson, N. Y., in writing to the editor of *Items of Interest*, gives the following interesting case of "broken teeth re-uniting:"

"In the summer of 1874, eight years ago, a blacksmith from a town near by, received a blow in the mouth from a piece of iron which he was trying to straighten on an anvil. The crown of the upper left lateral was broken off at the edge of the gum and fell to the ground; the crown of the lower left lateral was broken diagonally from the edge of the gum on the front side to below the gum on the inside, and turned into the mouth, the gum still adhering to the crown. An hour or two later I placed that crown in position and fastened it in place by means of fine wire around an adjoining tooth, and it re-united and is apparently as strong as ever. A few days since I filled a small cavity in the same tooth, and it still retained its original color. Cases of this kind are so rare it may not be uninteresting to mention it, as the tooth is still to be seen."

Beale's theory that "the teeth are *formed*," consequently "*dead* matter," certainly does not apply to the above case as reasonably as Heitzmann's, who claims that teeth are living tissues.

In connection with the above, we may say that one of our patients has a superior central incisor that was split, by a fall, during childhood, near the central line, from the cutting edge to a point above the margin of the gum. He tells us that he pressed the parts together as well as he could, and left it alone. Under this treatment, it did so well that now (some twenty years afterward) he has an excellent tooth, that has given him no trouble, and requires close inspection to observe the point, or line, of fracture. In this case, also, it would seem that there must have been "*bioplasson*."

We have the laugh on the "Herald of Dentistry" for inferring that the article in our Journal regarding the *gold-plated rubber plate* patent was written by our scientific editor, when he actually knew nothing about it. It would seem to us that a small amount of scientific knowledge would be sufficient to enable one to form a fair estimate of all such "wonderful inventions." If lacking in these qualifications, we suppose experience will of necessity be the school-master.

As regards the reply to our article and the cases mentioned as proofs of mercurial poisoning from rubber plates, we would remark that we see nothing to prove that the conditions were in the least produced by mercury from this source, if from any. Each case can be more clearly explained to any reasoning mind in other ways. We remember a case in our own practice of a lady who was for years out of health and employed many physicians, with no benefit, though one of them, on learning that she wore a set of teeth on red rubber, at once informed her that that was the cause of her ill health, and requested that a black rubber plate be at once substituted. The new plate was made and, as we expected, with no improvement to the general health, for the mouth was one of the cleanest and healthiest ever covered by a plate of any kind. It simply proves that M. D.'s are not always to be relied upon.

We know of another case where a gold plate was inserted (no rubber about it), and in a few days it was completely frosted with mercury. The plate was repolished, with again and again a like result, though, after some months, it retained its gold color. We would like to inquire where the mercury came from.

It so happens that these same M. D.'s many times introduce more mercury into the bodies of their patients than would serve as coloring pigment for several rubber plates, and it may be fortunate for them that they have some such loop-hole for escape when evil results from their own lack of judgment.

Keep on *plating*, gentlemen, till a complete gold plate (or something better) is produced, and then we will wish you abundant success.

A Sure Cure for Neuralgia.—An excellent liniment for neuralgia is made of sassafras, oil of organum, and a half ounce of tincture of capsicum, with half a pint of alcohol. Soak nine yards of red flannel in this mixture, wrap it around the head, and then insert the head a haystack till death comes to your relief.—*N. E. Homestead.*

A querist in one of the late journals desires to know the way to mount a set of teeth to perform the motions of mastication by means of clock-work. He apparently desires to invest in a noticeable sign, and for the benefit of any similarly inclined, we insert a clipping from an unprofessional periodical, showing how such *jaws* are regarded by the public :

" EMPTY JAWS.—Hard by a dentist's office, at a street corner in Chicago, is a hideous advertisement of the dentist's business. And this is the fashion of it : Inclosed in a glass case is a pair of artificial jaws, all glittering with artificial teeth ; and these are worked by invisible machinery, which is periodically wound up, and so the jaws are evermore kept going. They chew nothing ; they do nothing in the way of accomplishing any practical result, save as they call attention to the operator inside, who is supposed to be the maker and manipulator of those jaws. This ingenious device may possibly bring custom to a dental shop ; but for ourselves, we declare that we heartily abhor it. It is on the corner where we take the cars ; and there, in grinning ghastliness, it constantly confronts us. In heat or cold, by day or night, those brazen jaws, thick set with ivory, keep grinding on in an utterly aimless, and idiotic way. Time and again have we been tempted to shiver that glass, and end that exasperating exhibition, that seems like a mockery of our poor humanity."

We hardly know whether to deplore the ignorance and lack of appreciation such a man must have of his calling, or curse the miserable fraud he *did not* study with. We are satisfied that no dentist of to-day, who has any self-respect, and treats a student as he should be treated, will ever be disgraced by his making any such query as the above.

A VERY GOOD RESULT.

Eight years ago I visited a little town in Minnesota. My brother lived there, and he wrote : " Bring some instruments for filling teeth, for my wife and daughters need dental operations, and there is no dentist here." It was near the *commencement* of " The New Departure," and so I took some " putty," in the shape of " Stannous gold," and a few instruments. For the wife, and two daughters, aged fifteen and seventeen years, I filled twenty-eight cavities—ten of them crown and the rest proximal. The cavities in the mother's mouth were particularly bad, bicuspids and canines being mere shells.

Last week I visited the same family, in the same village. No dentist there. I took " putty " and instruments again to do what might

be necessary. I examined my former work carefully. *Not one* of those fillings had failed that I put in eight years ago. Not one of them had to be repaired. I found eight *new* cavities, altogether, in the three mouths, and filled them with more *modern* putty.

I send you an incident of office practice.

A month ago Miss H. came in my office.

"Good morning, Doctor," said she.

"Good morning, Miss H., you are a great stranger; I've not seen you for several years," said I.

"That's true, and I'll tell you the reason. Mother thought you overcharged her for the service you rendered me the last time," she replied, smiling.

"O, well, I don't know about that; I know that I charged you three dollars per cavity for eight fillings of 'Stannous gold,' and that was only half what it would have been if you had had the regular gold fillings," I remarked.

"Yes, but you did it so quickly; you was only two hours about it," said she.

"That may be," I replied, "but have they not done you good service?"

"I came to have you examine my teeth and see if they need any fillings," said the young lady.

I examined her mouth and found one cavity that needed filling. Every filling of "Stannous gold" amalgam that I had placed there seven years ago was in perfect condition.

I saw a small "pin head" gold filling in the crown of a lower bicuspid. I asked her, "Who put in this gold filling?"

"Dr. —— put it in a week ago, and I paid him six dollars for it. He frightened me about your amalgam fillings and said they were ruining my teeth and must be all taken out and re-filled with gold; and I really made an *appointment* with him to do it, but mother said I shouldn't, and sent me to you."

I filled the one cavity which I found with good "putty," and sent her away happy.

This young lady escaped the clutches of the Gold Fiend; but all are not so fortunate.

HENRY S. CHASE, M. D., D. D. S.,
St. Louis, Mo.

Dentists using sand-paper disks may be interested in a device for holding them, described by Dr. L. D. Shepard, of Boston, at the last meeting of the Conn. Valley Dental Society. Take a block of wood about two inches wide, by one and one-fourth inches thick, and of any length desired. Bore holes through the widest way, of a size a trifle larger than the different sizes of disks. A strip of brass or other metal may be made to cover a little more than half of each hole, with a U-shaped scallop over each hole, on the *open side*. The disks are to be inserted from the bottom, with the sand side facing the metal strip. The holes about half filled are to be followed by a light coiled wire spring, with a pin across at the bottom to hold it in place. The cross-hole for the pin should be of a size to leave the pin loose and easily removed for refilling. The disks are easily brushed with the finger from under the metal plate, the springs bringing them in turn up into position.

Dr. F. Alb. Boeck, of Berlin, in a very good paper on the hardening of rubber in the vulcanizer, comes to the following conclusions:

1. The hardening of rubber is a process of combustion during which by dry distillation a hard elastic residue remains as the result of an escaping of one equivalent of hydrogen.

2. The addition of sulphur serves as a stimulus to facilitate the separation of this equivalent of hydrogen from the carbon of the crude rubber.

3. The degree of temperature and the time required for vulcanizing are inversely in proportion; both depend on the quantity of rubber in the material.

4. The time of vulcanizing can be shortened materially by an increase of temperature, if for the transmission of the heat a substance is used which facilitates a uniform increase of the temperature and carries away the products of gases disengaged.

5. The best means to accomplish all these aims is steam.

—*Zahnt. Reform.*

To avoid joints in block sets, Dr. Höner of Berlin (Ger.), uses very hard plaster casts which he obtains by mixing the plaster with water in which he has dissolved about one-half teaspoonful of gum arabic. Try it.—*Zahnt. Reform.*

BIBLIOGRAPHICAL.

MICROSCOPICAL MORPHOLOGY OF THE ANIMAL BODY IN HEALTH AND DISEASE. *Carl Heitzmann, M. D.* J. H. Vaill & Co., 21 Astor Place, New York.

This work, just issued, is one upon which Dr. Heitzmann has been engaged in the preparation of for ten years. To this work there are twenty other contributors. Among the list are two names quite familiar to readers of the dental literature of the day—Drs. Frank Abbott and C. F. W. Bödecker. The work is divided into twenty-two chapters. The first chapter is devoted to "Methods." In the concluding section of this chapter, "How to use the Microscope," we find what seems to us to be the only deficient feature of the book—deficient in this sense, lacking definiteness and particularity in regard to objectives, their proper kind and use being the *sine qua non* of the great study of histology. By this lack the author is done injustice, because he understands the requirements thoroughly. To convince the reader of the fact, we will mention that previous to receiving his book, the writer of this notice had some correspondence with Dr. Heitzmann regarding the inability of some to see what he claims may be seen in "protoplasm," and the subject of objectives was discussed. The result of this correspondence was, besides other good received, additional light upon a hitherto but little discussed question—the *varying refractive power* of different *objectives*—the finding that the refractive power of a certain first quality *homogeneous immersion* objective being too great to show certain details of structure in a specimen that a *water immersion* objective of same magnifying power would show. Before finishing the review, it may be proper to say that we have been educated to believe that the purpose of an immersion fluid was to counteract the dispersive effect of air upon the light rays passing through the glass upon which and under which the object is placed. In other words, that the best immersion medium was that of which the index of refraction compared closest to the glass—either crown or flint glass—that the front lens of the objective was made from, and the covering glass of object was cut from, so that the rays of light shall be but little if any bent or altered from their direction as they pass through the object and enter the objective. This has been the object in view by makers of *homogeneons immersion* objectives. Biologists are becoming interested and much in favor of *glycerine immersion*. Those of

us who are students of histology know something of refractive power, as evidenced by the effects of different mounting mediums upon similar tissues—knowing that the details of certain delicate connective tissue are invisible if mounted in Canada Balsam, and yet quite perfectly visible if mounted in glycerine or Farrant's Solution. Our remarks are extended upon this point, because in justification of Dr. Heitzmann's claims, one of the many important reasons why the opponents to his theory *cannot see* what he and his students evidently *do see*, should be stated, as he has not done so in his book.

Following " Methods," in Chap. II. comes " General Properties of Living Matter "—" its arrangement in protoplasm," in Chap. III., and the phases of its development being considered in Chap. IV. Chap. V. is upon " The Structure and Origin of Colored Blood Corpuscles," by Louis Elsberg. Then follows " Tissues in General and Special," in several chapters, full and perfect in their order of treatment. Chapter XI. is upon " Inflammation." Preceding the subject upon different tissues in its different phases, is a sketch of history. In this chapter Dr. Bödecker contributes an article—" Necrosis." Chapter XII. is devoted to " Tuberculosis." Without reference to the careful treatment of this subject of tuberculosis of different organs and its etiology, notice should be taken of the author's evident rejection of a septic cause of tuberculous (scrofulous or catarrhal) phthisis, at a time when the germ theory of disease is receiving so much attention, and despite the fact of Koch's recent brilliant achievements in bringing to light a specific baccillus. The poisonous virus which he recognizes as the cause of tuberculosis. Notwithstanding Dr. Heitzmann believes in the work of Pasteur, Dr. Heitzmann has no reason to alter his views as promulgated in 1874. He recognizes the presence of septic organisms in tuberculous matter, but he looks upon their presence there as he would upon their presence in any putrefactive matter—more as a sequence than a cause. Following this is a complete classification of " Tumors." Chapter XIV. is upon " The Skin," epithelia and dermoid growths being duly considered. The next chapter is " The Digestive Tract," and Chapter XVI. is devoted to "The Teeth," by Drs. Bödecker and Abbott. The articles of both these contributors are abstracts from articles published in the *Dental Cosmos*, and they form such a large and valuable portion of the work that no dentist should feel that he can afford to do without the book. The remaining chapters are devoted to " The Liver," " The Respiratory Tract," " The Urinary Tract," " The Urine," " The Male Genital Tract," and the " Female Genital Tract."

It is utterly impossible to properly notice a book of this nature in so brief a manner as this, but we will conclude by remarking upon the illustrations. The plates are evidently all from drawings, and are *beautifully* executed throughout the work. So well is this part of the work done, that it may be safe to say of each contributor what has already been said by a great admirer of Dr. Heitzmann: "He is not only accurate in what he sees, but he is an honest, conscientious delineator thereof." R.

NERVOUS FORCE: ITS ORIGIN AND PHYSIOLOGY. *By W. C. Barrett, M. D., D. D. S.*

A paper read at Cincinnati, before the American Dental Association this year, has also appeared in pamphlet form. The name of the author alone is to us a sufficient warrant that something really valuable, not a selection of commonplaces, will be given to the reader of this philosophical production. We might disagree with the author in what he says about the all-pervading or imponderable ether. It is to us a very unscientific theory, held, as we well know, by many physicists; but to enter into the details of our objections here would lead us too far. That two substances like oil of turpentine and oil of lemons should be "chemically the same," but physically be different, we do not accept. It would be against analogies which have to help us along where we do not yet have anything else. Together with the most eminent authorities of our time, Dr. Barrett considers nervous force nothing but transformed other forces into that peculiar force called nervous force, an opinion with which we perfectly agree. What remains to do is to determine for every special case the components by simpler forces which make up the resultant in this case, called nervous force.

ETIOLOGY OF DENTAL CARIES. ACIDS OR GERMS; WHICH?

This is the title of a pamphlet by Dr. C. T. Stockwell. It is the paper read before the N. E. Dental Society and the Conn. Valley Dental Society. As we published it in our November number, we need hardly say that we agree in the main with the contents of the paper. It would not do to admire too much anything one of our friends writes, but we cannot help—just as if our worst enemy had written it—pronouncing this pamphlet one of the best things we ever read in the Journal. It reviews the investigations of the last year in a manner which cannot fail to prove very forcible to every reader. Dr. Stockwell comes to the conclusion that lower organisms cause and maintain decay, and draws inferences somewhat different from the usual alkaline mouth-washes. We wish we could send a copy to every dentist, that he may get something to think on, at least.

Our best thanks to the genial secretary of the A. D. A. at Chicago for the kindness of sending us a *List of the Dentists in Illinois*—those registered as well as licensed. Such things are quite useful to a journal.

SELECTIONS AND ABSTRACTS.

ANÆSTHETICS MEDICO-LEGALLY CONSIDERED.

D. J. G. Johnson (*Medico-Legal Society's Bulletin*) in an excellent paper makes the following points worthy of attention:

1. Anæsthetics do stimulate the sexual functions; the ano-genital region is the last to give up its sensitiveness. Charges made by females under the influence of an anæsthetic should be received as the testimony of an insane person is. It cannot be rejected; but the *corpus delicti aliunde* rule should be insisted on. Dentists or surgeons who do not protect themselves by having a third person present do not merit much sympathy.

2. Death from administration of chloroform after a felonious assault, unless the wounding was an inevitably fatal one, reduces the crime of the prisoner from murder to a felonious assault.

3. The surgeon has no right to use chloroform to detect crime against the will of the criminal.

4. The army surgeon has the right to use chloroform to detect malingerers.

5. The medical expert, notwithstanding he is sent by order of the court, has no right to administer an anæsthetic against the wish of the plaintiff in a personal damage suit, to detect fraud.

6. Gross violations of the well-known rules of administering anæsthetics, life being lost thereby, will subject the violator to a trial on the charge of manslaughter.

7. A surgeon allowing an untrained medical student to administer anæsthetics, and life being thereby lost, will subject the surgeon himself to a suit for damages. What he does through his agent he does himself.

8. The physician who administers an anæsthetic should attend to that part of the work and nothing else. He should have carefully examined the heart and lungs beforehand. He should have the patient in the reclining position, with his clothes loose, so as not to interfere with respiration; should have his rat-tooth forceps, nitrate of amyl, and ammonia, and know their use, and when to use them and artificial respiration.

9. In operations on the ano-genital region and the evulsion of the toe-nail, complete loss of sensation in these parts should never be allowed, and no operation on these parts at all should be had under an anæsthetic unless by the approval of a full consultation who have a knowledge of the dangers.

10. Chloroform cannot be administered to persons who are asleep without waking them. Experts themselves, with the utmost care, fail more often than they succeed in chloroforming adults in their sleep.

—*N. E. Medical Monthly.*